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AUTHOR Singh, Madhu
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ABSTRACT

Trends in combining learning and production were examined through case studies of school enterprises in 11 countries: China, India, Indonesia, Papua New Guinea, Germany, Botswana, Kenya, Ghana, Algeria, Cuba, and Costa Rica. The study focused on the following: types and structures of school enterprises; organization of learning; competency profiles, learning outcomes, and learning goals; curricular processes; teaching staff; the regulatory framework of school enterprises; external relations; school enterprises' impact; financial options for school enterprises; and mixes of private and public roles. Even within single countries, school enterprises were assuming diverse forms that tended to fall into three categories: programs emphasizing economic goals; programs emphasizing educational goals; and programs attempting to reach a balance between economic and educational considerations. Many secondary-level school-based programs were incorporating elements from several of the following modes of organizing learning and training: traditional apprenticeships, on-the-job training, and dual vocational training (combining practical training in workshops of private enterprises with training in traditional training centers). The following were among the factors identified as enhancing school enterprises: support from policymakers; institutional-level policies that balance economic, educational, and social goals; diversified financing; incentives; networks; support infrastructure; monitoring system; and high standards of training. (Contains 61 references.) (MN)

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International Project on Technical and Vocational Education
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# School Enterprises: Combining Vocational Learning with Production

*Madhu Singh*

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- *Programme Area C* concerns access to data bases and documentation, and strengthening of the UNEVOC network, in other words, with information and communication.

Under Programme Area A, one of the UNEVOC activities is to identify, analyse and disseminate information about successful practices of management and financing of technical and vocational education institutions through the concept of school enterprises, where vocational learning and production are being combined. This study presents the findings.

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*Ms Madhu Singh, Ph.D., is a sociologist and educationalist. She has been involved in issues relating to adult vocational learning as a lecturer in sociology of education at the Institute of Education, Poona, India, and at the University of London Institute of Education, London, United Kingdom. Her doctoral work at the Technical University in Berlin, Germany, is on vocational training for and in the informal sector in New Delhi. She is currrently working at the UNESCO Institute for Education in Hamburg, Germany.*

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Mailing address: UNESCO-UNEVOC • Fehrbelliner Platz 3 • D-10707 Berlin • Germany
[+49] (30) 86 49 15 41 • Electronic Mail: info@unevoc.de or uhber@unesco.org
WorldWideWeb: http://www.unevoc.de

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International Project on Technical and Vocational Education
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# School Enterprises: Combining Vocational Learning with Production

*Madhu Singh*

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# Preface

Close linkages between technical and vocational education and the world of work are of primary importance to the relevance of education for the world of work.

There are many ways to establish such linkages. UNESCO has, within its UNEVOC Project, sponsored a series of studies on existing approaches to cooperation between technical and vocational education institutions and the world of work. These studies have been carried out and published on various countries in Africa, the Arab States, and Europe.

Furthermore, seminars on cooperation between educational institutions and the world of work in technical and vocational education were held for Asian and African participants (Berlin, Germany, 1995; Ouagadougou, Burkina Faso, 1997).

The present study "School Enterprises: Combining Vocational Learning with Production" is another effort to disseminate information on modalities and experiences on interaction of educational institutions with the world of work.

Two issues have inspired the present study in particular:

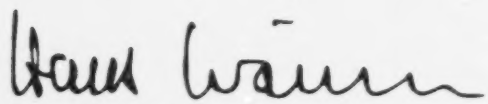
- linking the process of technical and vocational education to real work and market situations, and
- self-financing mechanisms for technical and vocational education institutions.

The first aspect relates directly to the mission of technical and vocational education, including the need to incorporate entrepreneurial skills and know-how into vocational programmes. The second aspect is becoming increasingly important as many governments find it difficult to supply their institutions of vocational learning with the funds required for their operation.

The case studies documented in this publication have been identified by the author or through direct communication with selected institutions. Others have been communicated to UNESCO in response to a call for case studies published in issue 10 of the newsletter UNEVOC INFO 10: We wish to thank all those who have contributed by readily supplying documentation.

The study provides insight into features and characteristics of school enterprises of various types and in a variety of environments. Thus others can benefit from their experiences. However, education systems, economic and legal environments as well as political and administrative parameters vary from country to country and even within countries. There may be reservations, e.g., relating to the problem of child labour, or to unfair competition between public or semi-public educational institutions and private enterprise in a market economy. Therefore, tailor-made adaptation is required rather than mere transfer of experience.

Readers are invited to draw their own conclusions from the materials presented.



Hans Krönner
Chief
UNESCO-UNEVOC
Implementation Unit Berlin

# 1 Key Issues and Hypotheses

**Changing economic environment**

The world is experiencing major changes in patterns of production and trade as well as dramatic innovations in technologies. Producers of goods and services are having to operate in a global context where opening economies to competition is the key to success. This competitive situation is affecting modes of production. In a more competitive economy, productivity, quality and flexibility are more important for the success of production systems than reduced wages. Firms are expected to allocate resources more efficiently to increase productivity. In order to compete internationally, they have to develop their technological and managerial systems. And, finally, they are expected to respond to a competitive environment by producing quality goods and to meet the demand for new products. These factors demand that labour be highly mobile and flexible in adopting new skills.

Both developed and developing countries alike are, however, unlikely to be able to adapt quickly enough to the demands of a more competitive global economy. This has resulted in the shortage of qualified workers for the new industries and modes of production as well as in the displacement of labour. An increasing proportion of the working population of the world is employed in micro-enterprises of the informal sector. This development is reinforced by a simultaneous cutback in state responsibility as a consequence of economic reform policies.

**Implications for skill development**

Changes in the nature of work, the technologies of production, and in standards for manufacturing and agriculture have pedagogical and educational prerequisites. The traditional workplace required teachers to convey knowledge emphasising factual information. It did not matter that learning was segmented from the economic and work context. With new and complex inputs to factor into a production equation, other operations become necessary (complex literacy skills, writing ability, and basic knowledge of mathematics, science, chemistry and biology). These so-called 'hard skills' are more important as the workplace seems to be profoundly changing.

Meanwhile mixes of general and technical skills are changing at all levels as new technologies penetrate not only the urban but also the rural sectors in the developing countries. There is evidence that many developing countries are facing the problem of lacking skills that are highly developed elsewhere. Even at the craft and artisan skill levels, they are lacking cadres of journeymen equipped to serve as masters to new apprentices.

While general education competencies play a greater part than ever before in facilitating skill acquisition, in the preparation of students for further learning over a lifetime, and adjustment to change at all levels in the economic structure, there needs to be a technical and vocational education system in place in which schools might provide specialised vocational training in traditional and newly-emerging skills needed for existing jobs and production practices, and which encourages self/wage employment and improves its productivity. With the increasing importance of the informal sector, processes of training aimed at providing employment deserve more attention. This includes the question of how technical and vocational training can be designed so as to be job-specific, vocationally specialised, and directly linked to employment. In other words: how can education and training contribute to people being better able to survive in the market and react better to changing market situations?

**Shortcomings of technical and vocational education systems**

These changes in skill requirements necessitate that technical and vocational education systems should ensure an adequate amount and quality of training. Overall trends, however, point to the fact that public technical and vocational education institutions often have not had a good record in efficiency and flexibility and sometimes are far removed from market realities. The majority of students are pursuing a vocational training that is unlikely to lead to the full-time wage employment they seek. This is especially the case for women. There is little or no attempt to cater for the needs of those who wish to continue living and working in rural areas or those who are compelled to join the urban informal sector. At the same time, the graduates are out of touch with the working conditions and technical possibilities in small and micro-enterprises.

Furthermore, budget allocations to technical and vocational education have often decreased so dramatically and, in view of the high costs associated with the latter, the time has come when developed and developing countries alike have to increasingly consider possibilities of generating alternative resources for the financing of technical and vocational education with minimum possible financial support from the government.

**The notion of school enterprises**

As a result of the above developments, new model schools have emerged – although entrenched within the conventional formats of institutional education and training – that are supposed to provide economically useful qualifications and facilitate their students' transition into the employment system in which graduates are able to immediately apply their skills. The entities established under this perspective include the notion of combining market production with systematic vocational learning through the concept of *school enterprises*. The teaching personnel are compelled to undertake continuing educational courses to adapt to new market conditions and to introduce new curricular conceptions adapted to new technological processes. The introduction of production assumes to bring the school closer to the realities of life, particularly the world of work, and goes beyond the prevailing thinking that individual lives are divided into a span of time just to study and another just to work. It is also justified by the need to find new ways of teaching and learning so as to increase pupils' interest and motivation in their studies. An important aspect of school enterprises is the factor of motivation for effective learning through combining learning with production, in that the training underlines the importance of visibility of future returns. Last, but not least, through the synthesis of education and production, technical and vocational education institutions are expected to exploit new financing options for meeting training costs.

**The international discussion on school enterprises**

During the 1980s, much attention was given to the combination of education with production at the level of international co-operation in the field of education. In November 1981, the 38th Session of the International Conference on Education adopted Recommendation No. 37 on 'Interaction between Education and Productive Work'. It was recommended that member states should co-operate at various levels in the development of programmes and practices through exchange of information and experience, joint experiments and evaluation.[1] In 1984, the Ninth Conference of Commonwealth Education Ministers was partly devoted to discussions on youth unemployment and in this context it was noted that the "criterion of production units within schools, and the integration of work experience with formal education" were among "a number of different ways of relating schools more closely to the world of work...

UNESCO's International Symposium on 'Innovative Methods in Technical and Vocational Education' held in 1989 in Hamburg, underlined further the international interest in production-oriented learning and teaching.[2] One of the major objectives was to define elements of close co-operation between schools and enterprises both at the level of the educational system and at the level of the process of vocational learning. In 1990, the 'Working Group on Production Schools' organised an expert meeting with specific focus on the theory and practice of production schools.[3] The aim was to gain information on the feasibility of such approaches, and to develop models of school enterprises and the specific conditions of their existence in less industrialised countries. The central motivation was to analyse reforms in didactic and vocational learning with special reference to school enterprises in industrialised countries and compare them with corresponding attempts in less industrialised countries.

A major emphasis in much of World Bank's lending for education has been on vocational education, primarily at secondary level. Initially these loans were concentrated on technical vocational schools and coincided with the World Bank's emphasis generally on physical facilities. But, in the meantime, several factors such as increasing relevance of school education were pushing in the direction of pre-vocational training in many or most of the general secondary schools. Findings with respect to the effects of pre-vocational versus general programmes on subsequent jobs and incomes of graduates have shown a failure to provide a reasonable financial social return on the extra costs of the vocational components in the curricula of at least the technical bias programmes.[4] Similarly, the strategy of combining general secondary education with production have begun to meet with disapproval among bilateral donor agencies on grounds of high costs, poor service infrastructure, and ineffective linkages with the labour market. Despite the present decrease in international recognition given to the idea of vocationalisation in the context of general secondary education, the principle of combining education with production continues to remain an important feature of education and training systems in less developed countries on account of several reasons which arise primarily from its potential contribution to the diversification of finance and relevance of learning for everyday life.

The assumption that somehow the pre-vocational programmes in the secondary schools would resolve the problem of unemployment among the young school

1 UNESCO, Paris, International Bureau of Education (IBE), 1982

2 Report of the UNESCO International Symposium, 1989

3 Arbeitsgemeinschaft 'Produktionsschule' (eds.), 1990

4 See the World Bank sponsored study on diversified secondary education in Tanzania and Colombia. Third World governments were strongly advised against the inclusion of vocational skills in the general education curriculum. Psacharopoulos, G. and Loxley, W., 1985

leavers rested on the false assumption that schools could substitute for training linked directly to employment. Educational planners and administrators often relied solely on existing public training facilities, especially technical institutions, polytechnics, non-formal training centres and public secondary schools, to solve the gaps in formation of human resources for economic development instead of seeking alternative institutional solutions. Moreover, there was a failure to distinguish between the vocationally specialised and generally practical in technical and vocational education.

The main questions that many countries face are when and how to make the transition from subjects that have broad vocational relevance (language, mathematics, science and practical skills) to programmes that will prepare individuals for particular jobs or clusters of jobs. Although general education, which schools can provide, enhances the individual's trainability, job-specific training is very important. International experience shows that such training is most efficiently provided after initial job decisions have been made and in institutions under, or strongly influenced, by the ultimate employer. This does not exclude the inclusion of practical subjects such as teaching of applied science, biology, chemistry or physics, or subjects such as electronics, nutrition, fundamental health practices and sanitation at both basic theoretical and immediate practical levels. General education and practical education are important foundations for change; but so is job-specific training. In so far as one enhances and complements the other, this is a real foundation for change. Practical education does not suffice to make school-leavers both willing and able to become productively self-employed. Job-specific training is most important for creating self-employment, especially in the growing informal sector, as well as to meet the new challenges in the world of work.

## 1.1 Economic, educational and social objectives of school enterprises

The principle of school enterprises can be interpreted as serving a variety of economic, educational and social objectives.

### Economic considerations

The economic considerations can be discussed along three dimensions: labour market, market production and school budgetary/self-financing aspects.

A major economic justification for establishing school enterprises is the need for promoting competencies for self and wage employment. Many of the students who come from disadvantaged families cannot afford to prolong their education. Increasing employment opportunities for participants who graduate from educational and vocational training establishments would therefore shorten the period of transition between school and labour market. Students from disadvantaged families require vocational competencies which make them productive members of the communities to which they belong.

The important way to make the transition from education to the labour market is by orienting courses to a particular market or sub-market with respect to products and qualifications. Market production is therefore to be seen as a vehicle for systematic learning as well as for entry to the labour market. Market production includes promoting competencies which are required for launching and managing small-scale enterprises. It also means promoting the ability to create one's own work, the ability to undertake surveys, and the ability to determine the market needs and economic potential of the catchment area of the institution.

In several developing countries, priority now being given to rural development – partly reflected in enhanced investments in integrated rural development, employment, income generation and amelioration of the economic conditions of the disadvantaged – will require skills inputs in diverse directions. Such programmes as the use of water resources, upgrading environment, social forestry, application of technology to farming and allied occupations, diversification of agricultural production in such directions as food processing and preservation, and promotion of horticulture and floriculture will require vocationally specialised skills which school enterprises can provide. The linkage of education and production, while meeting the existing skill requirements of the rural economy, will help in diversifying the rural economy.

As regards self-financing and the budgetary dimensions of technical and vocational training institutions, school enterprises provide a good alternative for matching operating costs by means of production for the market.

### Educational considerations

An important objective of school enterprises is therefore the combination of technical and commercial/business curricula. Market analysis, accounting, marketing, distribution of goods and services, costing, management and organisation of production, etc. is considered an opportunity to enhance the curriculum of production lines such as tool-making and farming. The knowledge and skills of the students are job-specific which they can use in the provision of goods and services required in the community.

A further basic educational justification for combining learning with market production is learning through hands-on experiences. The close connection between production and vocational education holds a major chance of avoiding the weaknesses of reality removed technical and vocational education, thus making reality-based learning possible.

The modality of school enterprises is expected to improve the integration of theory and practice through a better understanding of scientific principles and processes of deduction implied in the various types of job-specific tasks. It will assist in learning the role of different technologies and new methods of production. It will develop the ability to choose freely and more adequately the field of studies, work and career[5] and develop a broad range of practical, problem-solving and production skills and allow skilled workers to find new opportunities for vocational self-actualisation.

In the context of the achievement of the goal of universal basic education, the need for vocational education which promotes the capacity in students to produce goods and supply services becomes particularly significant.

Apart from promoting the ability to create one's own work, the basic thrust of the modality of school enterprises is the development of general personality traits or non-cognitive dispositions and orientations through involvement in real work processes and market production. These traits include self-confidence, risk taking, innovative behaviour, perseverance, creativity, uprightness, self-determination, habits of discipline, positive motivation towards work, ability to think in overall contexts, ability to solve problems, independence, team work, willingness to learn, flexibility, independent decision-making, concentration, responsibility, precision, information processing, independent learning, reliability, quality consciousness, cleanliness, thoroughness in one's work, development of self-esteem and self-assuredness.[6] The notion of combining production with learning in Waldorf Schools[7], in the alternative projects of 'Jugendberufsschule'[8] in Germany, in Don Bosco Schools[9] in developing countries, as well as in the Danish production schools, derives mainly from the importance given to practical learning in the development of personality, and the teaching of work tasks in order to inculcate values.[10] The expectations for these so-called 'soft skills' is increasing.

Thus the modality of school enterprises is expected to ensure a balanced development of the physical, emotional and mental attitudes, and moral and aesthetic values in the interest of youngsters and of society.[11]

**Social considerations**

The third rationale for the modality of school enterprises is social. Social and pedagogical considerations are mutually related. Thus, preparing and training for co-operative and participatory forms of production has not only pedagogical value (learning in team work) but also social value.

The modality of school enterprises will assist in bridging the gap that presently exists between education, community and the work situation, thus promoting an integration between education and development at the community level. This development at the level of the community also concerns promoting a sense of citizenship, a general acceptance of obligations and responsibilities, and clear individual rights and privileges, thus promoting social cohesion and social stability. Fear of youth unemployment is real, and the political ramifications of youth misbehaviour are disturbing. But school enterprises are not simply a means to keep youth off the street, but have the important function of mixing volunteer and community obligations to engender social commitment.

Not only will school enterprises provide basic training for employment and training in new skills and understanding in order to meet the challenges of rapid technological and societal change, but they will be in the service of the people, rather than only in the service of the secondary industry. This means reconceptualising technical and vocational education for meeting the needs of unemployed youth, women and rural dwellers in developed and developing countries alike.

Further school enterprises are expected to reduce discrimination against manual work and promote social mobility. They are expected to teach students to recognise the economic and social values of the various types of work by inculcating in them, through education, respect for workers, and for the world of labour in general and the realities of work.[12]

5 Ibid.

6 The growing awareness in developed countries of these personality factors has led to the introduction of newly developed methods of teaching, such as guide-oriented learning and training methods, project- and transfer-oriented training, modular training systems. See the series *Modellversuche zur beruflichen Bildung*, Federal Institute for Vocational Training, Berlin

7 Rist, G. P. and Schneider, P., 1982; Fintelmann, K. J., 1991

8 Ketter, P.-M., Petzold, H.-J. and Schlegel, W., 1986

9 Oerder, K., 1991

10 Castro, Claudio de Moura, 1988, pp. 195-206

11 UNESCO-IBE, 1982

12 Ibid.

## 1.2 Need for case studies

The move to incorporate enterprises in schools is justified on various grounds: improve the employment situation, raise additional resources, and find new ways of teaching and learning so as to increase pupils' interest in their studies. School enterprises contribute in a significant way to educational reforms in society in terms of alternative methods, structures, and even goals of learning.

The main questions are how can school enterprises prepare individuals for particular jobs and clusters of jobs? What can we learn from the experiences of various countries? What are the varieties of ways of combining productive enterprises and education and training curricula? What are the dynamics over time of developments in combining learning with the world of work? Which programmes seem to be most successful? Can they really contribute to facilitating transition from school to employment, or to raising school quality? What are the conditions – organisation, management, institutional involvement, teaching personnel and financing – for the effective implementation of school enterprises?

Although much is known about the philosophies of combining education with work and their incorporation in policy, very little is known of how such philosophies and policies have been translated into programme practice, or the practical implementation of the curriculum in the daily activities of teaching and learning in the school, the learning organisation, the teaching staff, the regulatory mechanisms and the financial aspects. The question of whether these schools exist in the form intended in the original objectives and whether they have been able to realise the concept of combining education with production deserves a special study.

While many projects are still entrenched in the formal sector, only sparse documentation is available on school enterprises in the context of vocational and technical education for the informal sector. The introduction of school enterprises in/for the growing informal sector therefore deserves special attention.

School administrators are faced with decisions on specific cost-effective quality-improving investments and various trade-offs. What they want are guides to specific investment choices. Can learning-by-doing and work experience and other pedagogical characteristics of the work of school enterprises be a good investment? What can we learn from the case studies on the importance of investment in quality compared to an investment in something else. To whom should quality-improving investments be targeted? To the socially disadvantaged?

However, simply knowing that productive work is a cost-efficient means of raising learning achievement is not enough, as educational managers are increasingly being held responsible for the achievement of products which reach well beyond the sales of products and services and academic achievement. The question that needs to be addressed is therefore: to what extent school enterprises promote specific cognitive skills, values, attitudes, and work culture such as diligence, creativity and personal responsibility?

Ministries of education and other agencies need feedback, partly to improve professional services and administrative effectiveness in the context of limited resources. The case studies have the important function of keeping local education researchers and decision makers informed of alternative techniques used elsewhere. Further, every rigorous analysis of an educational problem requires comparison of some kind. There is a growing tendency to see the market production of goods and services as the most efficient system. Can the same apply for education? To what extent and in what way should the private sector be involved in education and in human resource development. There is also a tendency to argue for the state to be less involved in education and in human resource development policies. But yet there remain significant parts of the public educational system which cannot be carried out through private means alone. Comparative analyses of cases can help in this respect to document instances of differential modes and mixes of public and private provisions' contribution to the criteria of efficiency and equity.

The case studies are expected to focus on the following broader policy issues:

1. How can technical and vocational education contribute to employment creation?
2. How can the school enterprise concept be one type of promotion within the development of diversified technical and vocational education systems?
3. How can competencies related to jobs be more effectively developed through co-operation with local industry and enterprise and thus reduce costs of state-run technical and vocational education as well as increase its relevance?
4. How can technical and vocational education be promoted for the growing informal sector?

## 1.3 The conceptual framework

In the following, a conceptual framework is proposed that will enable us to map out a wide variety of experiences in different systems and institutions on the basis of certain indicators. The notion of school enterprises will be seen as part of a broader educational methodology of providing educational experiences which

links the teaching-learning process with the world of work, so that students not only gain relevant skills, knowledge and attitudes and values, but also the necessary hands-on experience to apply these competencies in introducing goods and services.

The conceptual framework for analysing 'school enterprises' includes two fields or contexts 'working' and 'learning'. Education and training form part of the broader domain of learning, whereas productive enterprise forms part of the world of work. Each domain has its own characteristics and typical sets of activities. The major focus in combining the two domains lies in using productive enterprises as instruments to reinforce and enhance systematic and reflective learning, and for the sake of improving the relevance of education for later employment and self-employment as well as for sustainable socio-economic development of local communities and regions.

Although it is commonplace to refer to 'education' in terms of activities aimed at acquiring general knowledge, attitudes and values, and the term 'training' to the acquisition of occupational or job-related skills, the division needs to be seen as a purely analytical one as the two are interrelated dimensions within the domain of learning. Recent studies have shown that 'education' and 'training' or 'technically specialised job related skills' and 'general skills' cannot be isolated from one another as both are necessary for successful work performance.[13]

The notion 'productive enterprise' goes beyond productive activities in a narrow sense, i.e. which stipulate as the only condition that the volume of the goods and services produced by the students is to be substantial. Where the specific term 'productive enterprise' is used, it is meant to cover those work activities, such as production process, organising, planning, designing, marketing etc., aimed at generating goods or services that have economic, social and pedagogical value. Only those productive activities in the context of educational establishments fall in the category of school enterprises where there is a shared conviction about their pedagogical value and their economic necessity. The income generating aspect of educational establishments is to be seen as enhancing the learning potential of learners and as a focus of reflective learning.

The notion of 'school enterprise' is illustrative of a location in which an educational or training institution is, at one and the same time, an undertaking related to the world of work. The training institute or school may be a public institution or one run by a non-governmental agency. Some of the 'non-formal' institutions may be quite highly formalised. The concept 'school enterprise' entails the combination of learning and production at several stages, such as the education and training stage, the production stage and the enterprise stage.

The notion of school enterprises is an approach to learning involving an organised and direct interaction between the development of knowledge, skills, and attitudes and values (competencies) on the one hand, and the production enterprise on the other. The subject is involved in both processes and there is some degree of planned and intentional interaction between them. The above view of school enterprises however does not imply that a planned introduction of an element of productive work automatically leads to the involvement of trainees in vocational learning and training.

## 1.4 Methodology

The data for the report has been collected mainly by way of interpreting available literature on school enterprises with a view to capturing differences that occur according to the optimal interlinking between learning and production, the different socio-economic contexts as well as differences in the emphasis on the pedagogical value of introducing productive enterprise.

The notion of school enterprises is not only a concern in less industrialised countries faced with high levels of underemployment, but also in more advanced countries. The case studies therefore provide international comparisons, as the link between education and production has been undertaken in many parts of the world and in situations that differ widely in terms of socio-cultural characteristics, political and ideological systems, and levels of development. The report pays attention to traditions and possibilities in developing countries, but also makes references to possibilities in Western States, guided by liberal pragmatic ideas to the introduction of work orientation in schools.

In order to make a proper evaluation of school-run enterprises, descriptions have been complemented by analysis. Here is a shortlist of indicators for the evaluation of school-run enterprises:

- What role is the incorporation of production in the educational context supposed to play?
- What are the modes of organising learning?
- What are the determinants of educational outcomes?
- How can the vocational training and educational system be carried out through co-operation with

13 Singh, M., 1996

private industry and micro-enterprises in the informal sector?
- What is the role of different regulatory mechanisms?
- What are the factors for an optimal mix between involvement in real work processes and academic/ practical curriculum?
- What are the welfare effects of combining education with production?
- How can incentives be provided to teachers within the context of school enterprises?
- How are resources raised and what are they used for?
- How do graduates enter the labour market?
- How much public control or support should be introduced and, where public intervention is involved, how far responsibility and initiative may be decentralised?

# 2 Case Studies

This section presents case studies of school enterprises from China, India, Indonesia, Papua New Guinea, Germany, Botswana, Kenya, Ghana, Algeria, Cuba and Costa Rica. Following this, section three draws conclusions from the case studies and offers guidelines for planners and designers of programmes of technical and vocational education.

## 2.1 China

The separation of education from the world of work and labour which characterised the history of China has been blurred in the last four decades. The introduction of labour and work study into schools as part of the curriculum was an attempt to end the privileged role held by the educated in Chinese society. The part-labour, part-study schools in China initiated during the Communist period was the earliest driving force behind the movement combining learning with production. However, pragmatic economic concerns following requirements of personal survival, educational expansion and providing the modern workforce needed to modernise the country soon became equally important.[14] During the past 40 years the work-study programmes in Chinese schools have been making a transition to a variety of school enterprises which now serve primarily the vocational needs of the students, while at the same time providing much needed financing for Chinese schools. The burgeoning economic opportunities in China, coupled with increased school autonomy to develop new programmes, provide schools with the opportunities to greatly expand the work-study element. By the mid-1980s, the term 'school enterprises' was being used by some in place of 'work-study' as the economic activities of the school were expanded, and as the enterprises became more dependent on full-time employees in addition to further training of student labour. Today, they consist of factories, farms, construction companies, and a wide range of service businesses.

***Jinsong Vocational Senior Middle School in Beijing***

The Jinsong Vocational Senior Middle School[15] in Beijing has a school-run restaurant. The students are junior-middle-school graduates. During the three years, the pupils are trained in the theory and practice of Chinese cooking in addition to the general courses of the senior middle school. There is a cooking laboratory to start their practical training under the guidance of teachers. The cooked food is eaten by the students and teachers at a discount rate. There is a school-run restaurant for profit. The third-year students are expected to cook in the restaurant. There are no professional cooks. The cooking is done solely by the students under the supervision of the teachers. This constitutes a higher level training upon completion of which they usually find a job. Since there is a constant change in chefs, the quality of food is not stable. Nevertheless, the restaurant is well patronised. Half the profit is retained by the school and the other half is used for professional courses and laboratory practice. Since the government budget for the school is small and not likely to increase, the school fills the gaps in budget and expenditure.

***Secondary Vocational School of Nangong County, Hebei Province***

The school has set up a mushroom-species breeding base and a mushroom cultivation base. These bases not only provide mushroom species to the local farmers but also teach them mushroom cultivating techniques in short term courses. In addition, a school-run factory producing canned mushrooms was built through loans. The raw mushrooms are purchased from the farmers and, after being processed in the factory, are sold in the market. Thus a chain of production is set up from farmers homes to school, factory and market. The farmers attain a higher profit than those who have not joined this chain of production. The students are graduates of the junior middle school.

14 Zachariah, M. and Hoffman, A., 1984

15 Senior middle schools are of a duration of two to four years, after completion of junior middle school. Students are between the ages of 15 and 18.

During their three-year study at the vocational school, half the time is devoted to learning the general courses required in an ordinary senior middle school.

***Xianyang Machine Tool Technical School***

This is a secondary technical school, whose aim is the training of skilled workers and technicians. While providing practical training, such a factory has regular professional workers and fixed kinds of products. The factory is run by the school, and it ensures that the productive activities in the factory match the curriculum. The factory - just as other regular factories - can receive investments and loans. In order to support such a school enterprise, the government has a special preferential tax cut of 50%, on the condition that 60% of the profit is used for expanding and improving teaching facilities. 1,500 students are enrolled in this technical school. Students are graduates of lower middle schools and study for four years. The school has laboratories to complement theoretical teaching. The factory produces universal and tool-grinding machines. There is a teaching staff numbering 574. The school possesses 500 major machines. The annual output is 200 grinding machines. The profit in 1988 was 464,000 yuan.

As regards the curriculum, there are 20 weeks of practical training during four years. Basic skills such as that of a fitter are taught in separate learning workshops. Practice in operations takes place under the supervision of experienced instructors. During their training, students can finish part of the production, but the finishing work is done by employed professional workers in order to reach the precision and quality specified on the blueprint.

***The Baofengsi Secondary Forestry School***

The Baofengsi Secondary Forestry School in the mountainous areas of Zhuolu county, Hebei province, aims to improve the yield of almonds by imparting skills in scientific management. The trainees have a middle school education. The school has a school-run orchard. The school transmits scientific theory plus practice in grafting, pruning, biological and chemical knowledge in order to prevent and eradicate plant diseases and insect pests. Since most students have farms at home they can apply the techniques from school to their homes. Students bring to school the problems they face in their own orchards at home. For those who have no orchards at home, the school provides loans to set up one. The combination of study and management brings quick economic benefits. The amount of almonds produced is greater than that produced by the local farmers. Students come not only from local areas but also from far-away villages. For these students, sandwich courses are prepared, allowing the students to study at school for a period of one month and then go back home. The school has provided technical service to 17 villages in the area.

***Guangzhou School No. 38***

The school was established in 1957 as a junior secondary school. In 1970, the senior secondary component was added. In 1982, it was converted from its general secondary status to a mono-vocational garment school. It has 1000 students enrolled, taught by 115 faculty and staff. The junior level classes maintain their general school academic curriculum, while the senior secondary level provides nine academic subjects in addition to vocational training. The vocational training includes required courses in management, design, and manufacturing in the garment industry; and graduation requirements include a demonstration of design and planning skills and a public display of the student's work. School 38 does well in national garment competitions and the fashion team regularly holds fashion shows in Guangzhou.

The school enterprises are directly related to the vocational focus of the school. The school's enterprise is a factory which provides the students with directly applicable experiences and a chance to work in the clothing business. Its original purpose was combining theory and practice. In 1994, it expanded its product line to include a variety of current fashions and a number of jeans products. In addition to students, the enterprise employs 36 workers.

While the focus of the enterprise serves the educational interest of the school well, the enterprise is not always profitable as it suffers from a shortage of marketable products as well as competition from foreign businesses which produce garments more efficiently. There is also a need for investment capital to update old equipment.

***Guangzhou School No. 6***

This school was founded in 1937 and is one of the four key schools in Guangzhou. It has 1900 students, 300 of whom are residential. Audio-visual and science facilities as well as computers form an important part of the teaching aids. The school prides itself in the success of its graduates, most of whom go on to tertiary institutions.

The current curriculum requires the students to take vocational skills subjects each year. These include typing, mechanical knowledge, industrial arts, basic computers, Chinese word-processing and mechanical drawing. Work-study has not been thoroughly incorporated into the curriculum. There are plans being made to incorporate students into the factories, both for appreciation of labour and for job skills. However, there is some ambivalence about these plans, because

time spent in work orientation means less time for the academic study necessary for university admission.

The school-established factories complement the subjects taught. There was a heavy student involvement in the early years. However, in the early 1980s, the reduction of student hours in the factories began, and full-time workers were employed. In 1994, the factories consisted of two separate printing facilities and a chemical facility. The printing facilities printed the official envelopes and papers for the post office and tickets for the public transportation system. The chemical facility worked in conjunction with an electrical research facility in Guangzhou where products are developed and exported to the Republic of Korea. The chemical facility was moved several miles away from the school because of the use of toxic chemicals and the concern for environmental standards.

In 1994, these factories employed about 60 technicians, engineers and skilled workers, and six managers. The profits from the factories totalled 1,000,000 yuan and provided 50% of the schools operating funds, equal to the amount provided by the government to run the school. The money was used for staff benefits and salaries, for facility repairs and upgrades, for educational equipment, and for reinvestment in the enterprise.

## 2.2 India

***School Enterprises in Vocational Secondary Schools***

The establishment of school enterprises at the vocational secondary level (classes IX and X) in India needs to be seen as an attempt to evolve from prevocational options of broad vocational relevance to job-specific training introducing goods and services for the market.

The Education Commission (1964-1966) recommended vocationalisation of secondary education (upper and lower). The National Policy on Education (1986 and 1992) gave renewed emphasis to the introduction of vocational education programme in classes IX and X. The significant purpose of vocational education programme (VEP) in classes IX and X is to provide students with professional skills which are required in the economy. 70% of the time available is devoted to vocational theory and skill training. Apart from the practical subjects in laboratories and training workshops at the institution, it is planned that strong school-industry linkages develop so that students of vocational courses get an exposure to real work situations in the industry. Highly skilled professionals are invited to schools to teach practical subjects to vocational students. There is provision for on-the-job training in the evenings during the summer vacations at the end of class XI.

Under the existing vocational education programme (VEP), infrastructure facilities have been provided for training in vocational skills. These same facilities are going to be used for the school enterprise after ensuring that they are relevant to the operation of school enterprises. With these minimum facilities, the school enterprise is expected to generate its own resources in future. Raw materials are provided through the centrally sponsored scheme. Students learn the skills in the training workshop-cum-productive enterprise, and gain experience in the marketing of products and services.

In the design and organisation of the programme, many parties are given responsibilities. These include the PSS Central Institute of Vocational Education, responsible for providing guidelines on the establishment of school enterprises and overall design and co-ordination; the State Ministries of Education, responsible for implementation and academic support; the District Vocational Education Committee (DVEC) including officials from government departments dealing with health, electricity, rural development, backward classes, finance, employment and human resources; and finally, employers' organisations and community organisations involved in providing essential services. The DVEC takes appropriate steps to promote school-industry linkage, assesses the strength and weaknesses, and suggests remedial measures.

The DVEC has been assigned the task of playing a leading role in devising industry-school partnerships for rural development. As massive investment in activities is going to take place in the areas of rural housing, watershed management, fisheries, agriculture wasteland development, floriculture, food processing, domestic appliances and communication, the school enterprises are expected to exploit these opportunities in two ways:

1. by bringing in new vocations into the system of vocational training and matching these to the needs in rural areas;
2. by acting as one of the bidders for taking up various appropriate jobs from these investment opportunities.

These are expected to be accomplished by appropriate linkages and networking with various governmental and non-governmental agencies such as IRDP (Integrated Rural Development Programmes), TRYSEM (Training Rural Youth for Self-Employment) and KVIC (Khadi and Village Industries Commission).

The PSS Central Institute of Vocational Education is an apex institute which provides technical support to states and schools introducing vocational courses. It has developed 80 competency based vocational curricula in agriculture, business and commerce, engineering and technology, health and paramedicin, home science, and humanities at the higher secondary school stage. Currently, over 150 vocational courses are being offered under the centrally sponsored scheme in different states in India.

In operationalising the concept of school enterprises, the following parameters have been taken into consideration: production activities and services are selected within the broad area of VEP on the basis of assessment of community and market needs; management of production activities include the procurement of raw materials, processing and marketing; regulating the mode of sharing the gains and losses of the activities. This is undertaken to act both as an incentive to attract and motivate teachers and students, and to ensure that a self-sustaining process within the school system is set in motion.

With regard to the implementation of the school-run enterprise programme, a critical area of attention is the autonomy in decision making and the role of different agencies at state level as facilitators rather than supervisors or checkers.

The school enterprises manage/operate through the School Vocational Education Committee consisting of the principal/vice-principal as the chairperson, the teachers concerned, and 2 to 3 members of the community including representatives of the PTA (Parent Teachers Association), industry and government agencies. In addition, the person responsible for accounting and storekeeping in the school and one student representative for each vocation may be co-opted onto this committee.

The School Vocational Education Committee is responsible for approving jobs, training teachers, ensuring the availability of raw materials, giving all needed support, publicising the activities and creating new markets, evaluating the completed projects and monitoring the running of school enterprises, ensuring the quality of production and services, ensuring proper running and maintenance, developing the mechanism of proper economic disposal of unsold rejected items, comparing performance indices to enhance productivity. Finally, this committee will report on the activities to the higher authorities and create, in general, a healthy climate for the survival of the enterprises. It has also been proposed that co-operation and co-ordination should be developed with different vocational institutions in the neighbourhood which run school enterprises with regard to the exchange of experience, fixing of rates for services and establishing codes/ethics to be observed.

Students and teachers operating a school enterprise make up the working group. Monitoring is a joint function of the working group and the School Vocational Education Committee.

Under the centrally sponsored scheme on vocationalisation of secondary education, every school running VEP receives a financial assistance of 200,000 rupees per course of which 100,000 rupees is used for the construction of work sheds, and the other 100,000 for provision of equipment/workshop and laboratory facilities.

For purchasing raw materials and making the required working capital available, especially in the initial years, several channels are to be tapped. The ultimate objective is self-sufficiency at the earliest, and surplus generation for future growth and development. Working capital resources include, in order of priority, advances from customers, raw materials from customers, shares/equity from teachers and students, loans from the parent teachers association or school funds, loans from commercial and co-operative banks, seed money from state governments, project-based state government funding schemes, and any other resources based on business norms.

In its guidelines for school enterprises, the Central Institute of Vocational Education has recommended that production for the market should have pedagogical benefits: being an additional source of understanding of appropriate concepts such as profit and loss. The detailed costing and pricing of the job is part of an educational exercise. Costing in engineering enterprises includes: record labour rates for the chosen activity, prepare estimation of cost of various products possible with the given skill, compare with market rates, match job orders to the available time and human resources, prepare job cards, collect advance from the client to cover material cost, keep records of time, machine and labour, work out estimated delivery, prepare final cost and bills, review and document. Costing services (individual or within the premise) include: solicit or obtain request for service, choose students for the above, discuss and complete requirements with clients, visit the site and finalise the service required, prepare and estimate, finalise the date of service, get an advance covering materials in cost and kind, provide the service, receive payments, review and document. Costing in agriculture production includes: working out the cost of production of possible crops, selection of crops, maintenance of records of inputs and costs, estimation of profit or loss,

economic review of the above sales and harvest operations, and recording standard of performance.

In the cost analysis of products/service, 10% of all direct costs such as labour, material, energy (power rating) as well as depreciation and maintenance (fixed by the teacher) is to be included.[16] The use of school infrastructure facilities may be made available to students for commercial activity at a nominal rental fee.

Surplus from sales is the amount left over after subtracting the expenditure on raw materials and utilities. The surplus is distributed as follows: 25% school fund, 15% maintenance, 15% as separate account for development of the school enterprise, 45% for students, 10% for teachers, 2% for attendants, 1% each for the accountant, vice-principal and principal respectively.

Technical experts are drawn from industry, professional institutions including laboratories and universities, and from among manufactures in local small-scale enterprises. Technical aids include manuals, journals, and lectures by technical experts. State or regional testing laboratories are responsible for quality control. The basic idea of technical support is to encourage the students to innovate and experiment with creative ideas. The staff are given re-orientation courses in different institutions where they can get hands-on experience and exposure to marketing/commercial and professional functions.

***Service Production Centre, Vigyan Ashram at Pabal, Pune***

The Service Production Centre in Pabal, Pune, is an education-cum-production unit attached to a vocational secondary school. The primary objectives of incorporating enterprise into the secondary vocational school are improving the relevance of education, making the school a viable economic unit and promoting entrepreneurship by creating confidence among its students that they can run a profitable enterprise. Vocational education includes teaching how to operate in the open market and make the production unit viable. However, as the educational institution is primarily a learning place, the aim is to promote a work culture and business environment rather than judging the school in terms of the volume of profits alone. The idea is that the vocational training institution should work like an industry. Only in this way is it possible to create a real life situation. The underlying assumption is that modern skills cannot be well developed in schools until the prevailing 'ethos' of the latter is that which is required for vocational preparation.

In the initial stages, there are obvious constraints of operating an educational institution as a commercial unit; for example, the overheads of education such as salaries of teachers cannot be borne by school production. Therefore the school has adopted the concept of a semi-commercial enterprise. This concept has been proposed in order to separate the educational functions from the productive functions and to give its students a greater opportunity to experiment and innovate. Only when the school enterprise becomes an economically viable unit will the management of the school be included in commercial operation.

The staff remain alert and up to date, bring new opportunities to light and encourage entrepreneurship. All enterprises in the region have been started by ex-students. Many of the staff members have left to start their own enterprises because their stay has given them the confidence. Staff members setting up their own enterprises is not seen by the management and students as a loss to the institution. Instead, it is regarded as setting a good example for others to start their own enterprises. Instructors receive their training at the Service and Production Centre, Pune.

A wide variety of products and services are provided by the Vigyan Ashram. These include dairy and agricultural products (poultry, eggs, broilers) and breeding goats. Technical services include electronics, production of ERM instruments, workshop fabrication, water resource management, rural laboratory, mechanical bullock, publications, and rural business centre.

For over 9 years, the vocational training school has run broiler farms where students invest their own money and, after completion of the course, get a share of the profits in proportion to their investments. Many of them start their own poultry farms.

Entrepreneurial success is most marked in the field of fabrication workshop. Other branches have not been as successful. Nonetheless, more students start poultry farms than fabrication workshops. Ex-students show very little interest in agriculture as it is difficult to successfully operate as a commercial enterprise. The production of fodder crops has however been consistently making good profits. A dairy can also be run as a semi-commercial enterprise with a steady turnover. But, like agriculture, it is not glamorous and does not attract students. The artificial insemination services for goats is another regular but low volume semi-commercial enterprise.

Novel services include vertical electrical sounding. This method has been one of the most popular and unique agricultural services, of strategic value to the

16 See Verma, A. P., 1996

rural area. Each test costs 1000 rupees. Two of the staff members have set up their own enterprises in the neighbourhood. The rural laboratory, giving medical diagnostic service, has been operating on a no profit no loss basis for about 6-7 years and has a net surplus of about 300 rupees per month. The sum is not large but the service is appreciated by the farmers. It is not good for income generation. It has a regular stream of girls coming for training. The geodesic dome is being run as a commercial enterprise by a single student. In the construction section, there is a consistent demand for boys to build geodesic domes. This is, however, not being taken up by the school, but passed on to ex-students who have become contractors. It difficult to organise this enterprise because the service requires staying outdoors for extended periods. But it has tremendous potential.

In the vocational secondary schools located in the vicinity of the Vigyan Ashram, the services are predominantly workshop services. The incorporation of services such as electrical, water prospecting and agriculture depends on the interest shown by the instructors. Sometimes they have to be motivated through incentives to conduct courses in rearing poultry.

The value of services provided vary from school to school depending on the interest taken by the instructors. The non-grant expenditure comes from locally generated funds, i.e. those paid for by the community. The learning-cum-production workshops of the Vigyan Ashram as well as those in the neighbouring vocational secondary schools have been able to reach a level where roughly 1/4 to 1/2 of the total expenditure comes from locally generated funds.

The production-cum-training centre is a feasible programme for the rural area including the smaller villages of less than 10,000 population. Firstly, it complements the existing vocational education and, secondly, it facilitates the economic development of the region.

According to the head principal, the school enterprise's success depends on inculcating an appropriate work culture among the youngsters. Further, he mentioned that the "10 to 5" work day will have to be replaced by longer working hours. The staff should have an incentive system by which they get a core salary and the balance is linked to their productivity. The training of new staff should be an ongoing process, because it is to be expected, that if the centre is successful, many of the staff would leave to start their own enterprises and new staff will have to be trained. There should be a selection process for attracting candidates with an entrepreneurial spirit. Agriculture and animal husbandry are well suited for production with a view to supplementing the income of the institution or reducing the dependence on government support. In this connection, however, suitable top-level management will be necessary to avoid corruption. Though engineering subjects are suited for the service industry, they do not necessarily contribute much to resource generation. Nevertheless, they need to be promoted in order to meet the demand for engineering products and to help in creating new employment opportunities. As a policy measure, such service-production centres are expected to play the role of path-finders rather than compete with small engineering industries in the rural areas.

***Production Centre in Shantikunj Ashram, Haridwar***

Shantikunj was established in 1969 by Pandit Sri Ram Sharma Acharya, who was an active associate freedom fighter of Mahatma Gandhi. Shantikunj follows the Gandhian philosophy and carries out the prime objective of disciplined modest living, and extends spiritual, moral and financial help to weaker sections of society.

The production centre was basically set up to make the Ashram self-reliant. It comprises of a number of small enterprises in the following trades. Candle making, nara-feeta (thread and silk string), bees wax and honey production, bakery, agarbati (incense sticks), chalk making, bookbinding, rubberstamps, photo lamination, ballpen refill, tailoring, religious thread (janeu), printing press liquid, photography, oil extraction, handloom fabric, papad making (linsen bread).

Small-scale enterprises were set up in Shantikunj in 1986. These enterprises operate on a very modest, low-cost scale and employ services of voluntary workers. The cost of the products include 4 to 6% of the cost of raw materials, electricity and water expenses. The bakery unit is housed in two rooms. The first room has a traditional oven (bhatti). Locally available wood is used as fuel for the oven. The second room is used for pre-cooking preparations.

The breads and biscuits are sold to the inmates and visitors to Shantikunj with a profit of 4 to 6%. The breads and biscuits are sold unpacked in order to reduce production costs.

Since the consumers are mostly people who visit the Ashram (Shantikunj), which in a sense provides a service to these visitors, it does not compete with the local enterprises. The production centre is self-sustaining and generates funds for its continual running.

Production centres of the kind at Shantikunj have been established in vocational secondary schools as a step forward towards a more effective implementation of the Vocational Education Programme. The primary

aim of such production centres is to provide skill training to students and some incidental production and profits. Small orders for any product are procured from the schools' staff. Execution of these orders enables the students to get sufficient practical training, refine their practical skills, and improve the quality of goods during practical training or practical classes.

***Don Bosco Technical Institute, New Delhi***

The Don Bosco Technical Institute, New Delhi, was established as an alternative to the existing engineering colleges and polytechnics. The idea was to set up a machine workshop to be later followed by motor mechanics and electrical engineering. The trades turner and fitter were approved in 1977. By 1983 the trades draughtsman (mechanical) and machinist (grinder) were added. Today there are 200 trainees in the machinist section.

The institute was initially established to train local Christians for modern industry. But, as training at this level was not really considered respectable, the institute was not working to its optimal capacity. Those with calibre preferred to go to college or seek admission at higher levels. Those who came had not completed their Class X, which meant that they had to be drilled in basic competencies of English and mathematics. The other difficulty was to get into working relationships with some of the local industries.

Initially, the training in mechanical engineering was for 4 years, with a one-year preparatory course in basic English and mathematics for those who had passed only the 8$^{th}$ grade. Experiencing the difficulties that this brought to teaching, it was soon decided to raise the entry requirement to Class X, and those who did not pass this stage would have to sit for an admission exam.

The structure of training has been restructured. Nowadays, students do the basic and intermediate mechanical engineering within two years and the final year is devoted to advanced courses in different branches like CNC. CNC programming has been introduced to enable better job opportunities and keep pace with technological advancement. Diplomas in tool and die-making, tool designing and mechanical engineering (technician) are awarded to successful candidates.

As part of the programme of the Directorate of Vocational and Technical Training to encourage computer training programmes in private centres, a computer department has been set up which includes a hardware and software training centre. While most computer centres in Delhi cater only to the upper class, Don Bosco is a place where the less privileged have a chance to learn.

The Belgian non-governmental funding agency COMIDE provided the necessary funding for the printing section. The training lasts two years. In the first year, the students are given a general orientation and basic knowledge about the various aspects of printing, namely: composing layout, camera, film assembly, plate-making, printing and binding. Upon completing their basic training in printing, trainees receive specialised training in selected sections that match their capabilities, inclinations and talents. Printing education and industry has a bright future. There are about 70,000 to 80,000 printing presses in the country, excluding the newspaper industry and public sector printing presses. The printing industry requires trained and technically qualified personnel. Training therefore becomes an imperative input that needs the foundation of quality. The ability for hard work and meeting deadlines are the most important work attitudes that are inculcated during training in the field of printing.

An important part of the printing school are courses in desktop publishing and digital pre-press. Some of these trainees also undergo a one-year training in film assembly and plate-making. Both these courses are aimed at providing the students with a sound theoretical and practical training.

Although, in general, it is not easy to expose students to actual jobs in the field of mechanical engineering, the institute has been quite successful. This is the only way to meet the demand for graduates by the local industries. Working on actual jobs is an on-going process which needs hard work and dedication.

As the machine section is the base of all other branches of engineering, the mechanical section has been upgraded regularly.

The Don Bosco Technical Institute finances up to 40% – occasionally more – of its operating costs through external contract work carried out in their training workshops. There is an attempt to increase or maintain this self-financing share in the technical institute by employing full-time workers. At the same time, strong emphasis is given to a comprehensive theoretical and practical vocational training in conjunction with social education. The technical institute is not seen as mere workshop training; great importance is attached to the inclusion of vocational theory, general education and social education.

***Don Bosco Self-Employment Research Institute, Howrah***

Young technicians passing out of the Don Bosco high schools and technical institutes often find it difficult to find jobs in the already saturated employment market. A further problem is that the sophisticated training given in the technical institutes reaches only a limited category of youth – the intelligent ones. The real situation in India is that there are hosts of youth who are school drop-outs or lack text book handling of skills, although not entirely unfurnished with practical intelligence. Don Bosco has been able to cater only to a very limited number of these local boys and young men who find that they cannot cope with the formal system of education.

It was therefore felt that a new training programme should be devised: less sophisticated, short-term and employment-oriented. Beneficiaries would be school drop-outs, poor orphans, physically handicapped, scheduled tribes or castes, and those below the poverty line. Unlike the training in a complicated machine tool workshop, this was going to be a systematic training in the development of a skill to operate the essential machines to do one particular job accurately and profitably.

With the financial assistance of Misereor of Germany and Indo-German Social Service Society of Delhi a start was made. The Don Bosco administration succeeded in getting two large buildings on rent very close to the Don Bosco Technical School. The Indian Overseas Bank provided regular financing at the differential rate of interest of 4% to the tiny entrepreneurs. The Don Bosco Self-Employment Training Institute, Howrah, was officially opened in 1977.

This institute lies in the Liuah industrial region in the state of West Bengal and is in the heart of factories for manufacturing engineering goods. The locality has a population consisting of Bengalis, Biharis and other groups who have come together in search of work in the many mills and factories around. With the increased problem of population growth and labour unrest resulting from the closure of most of the factories in and around the area, unemployment and other social problems have taken root. The youth are the most affected. The unemployment rate is expected to continue to worsen. 80% of the children drop-out of schools before they reach class X. The major reason for drop-out is poverty. In a survey published by the Indian Statistical Institute in 1979, on primary school drop-outs of 24 Parganas, Hooghly and Howrah districts in West Bengal, it was found that, from among the school drop-outs, 72 to 80% of boys and 56 to 68% of girls are forced to leave school for economic reasons, such as supplementing the family income or looking after their younger brothers and sisters.

Training has been made accessible to school drop-outs and socially disadvantaged youth. As the establishment of enterprises forms an essential part of this training, it provides the underprivileged school drop-outs an excellent opportunity to earn, and therefore serves as a solution to the unemployment problem. The scheme also benefits the physically handicapped and provides an opportunity for girls and women unable to make a headway in formal education. It helps them to augment their income and sustain a family. Furthermore it promotes positive values to work and helps in facing the challenges of a competitive world of work.

15 to 20 trainees are given non-formal training courses of a duration running from three months to one year. All who complete the non-formal training programme successfully are awarded a certificate.

During the training in the non-formal section, the instructors and staff members assess the aptitude of potential candidates to perform a particular job or line of jobs with proficiency. The Don Bosco Technical Institute with its market research, experiments, prototype development, and regular ancillary development always has a few dozen prospective orders in line with the liaison agents to be started at any given time. The aptitude study of a candidate is always in line with these pending orders or market requirements. Selected candidates are fitted into one or another of the pending jobs. Upon completion of the six-month non-formal courses, those students are selected who fulfil the requisites of a self-employment project. However, the technical staff do not only base the aptitude of the candidates on the existing job orders, but on the basis of new jobs, skills, orders, and know-how resulting from research activities and publication.

Once the trainee has opted to join the Self-Employment Training Institute, he/she is introduced to the local bank with a request and recommendation for bank financing to start a tiny enterprise on his/her own within the institute's infrastructure and rules. A project report is prepared to present to the bank for a necessary loan sanction. Bank accounts are operated jointly by the beneficiary and the director or principal. The new entrepreneurs of this type are under the constant vigilance and monitoring of the staff. They are also introduced to the marketing network. From then on, each of these trainees works and produces a marketable item with an order from the liaison agents.

Selected machines are purchased against the bank loan. These machines are installed at the institute and

each trainee starts his/her own respective production under the close supervision of the technical staff. A boy of this category masters his machine in two weeks and reaches an efficiency of up to 50-60% with regard to production and accuracy.

At this point, each project holder is shifted along with his own machine to the production section where he is allotted a space and other amenities. From this moment on, this young entrepreneur becomes a productive person and starts his/her own production and sells his/her product. The monthly earnings are shared between the bank (40%) to repay the loan, and the Don Bosco Institute (25%) for the infrastructure assistance. The balance of 35% is taken home as own income. Thus the entrepreneur becomes a breadwinner even while a trainee in the institute.

The enterprises are ancillaries to industries. It is an opportunity for the industry to show concern for the needy. Most of the companies that Don Bosco approaches come forward and assist the institute by providing it with regular work orders and imparting their know-how and development techniques. Some industries even send a team of their development engineers to work with the students to get production moving and to overcome the teaching problems that come in the way of training. The cost of production is cut down because the production units act as ancillaries to the industries. Ancillary development therefore constitutes an important objective of the school enterprises.

Attempts to develop new and sophisticated components for various industries have been successful mainly because the project holders have the backing of the main workshop of the Don Bosco Technical Institute with its large variety of modern and sophisticated machines. The products coming out of the Self-Employment Institute are thus of a high standard and precision.

Miseoror of Germany has provided most of the modern machines which are today the backbone of the Technical School and of the Don Bosco Self-Employment Training Institute.

It is found that a boy of average calibre with average working conditions can repay his total loan in 36 monthly instalments. After the repayment of the loan, 40% of the income is taken home; the rest is paid to the institute. This gives an added impetus to the newer project holders. After repayment of the loans, the staff becomes preoccupied with the final settlements of the students in their own premises or in rented spaces. This is made possible through the trainees' own savings, with the help of benefactors or banks and government programmes for the disadvantaged. The idea is to utilise the programmes of self-employment that are due to them from the government. There is talk of establishing a corpus fund for helping young entrepreneurs especially in the initial stages.

The institute has been renamed Research Institute because the nature of the activities involved in it are those of research: i.e. finding out ways and means to help the school drop-outs and handicapped youth. They are the most disadvantaged, excluded and marginal, and are considered a threat and a burden to the nation. The Don Bosco Research Institute motivates them to learn, trains them to work and earn, and induces them to produce marketable products. It makes them tiny entrepreneurs. Each of the staff members researches the students capabilities to learn to produce, to sell, to earn, to survive, with a wide option of 15 trades and 30 more in due course.

The secret of success in any manufacturing or servicing enterprise depends mostly on the identification of proper liaison agents with marketing skills and correct motivation and training, and who can do business without exploiting the less privileged. Salesmanship is promoted as a profession. The art of manufacturing and selling are seen as separate activities and qualities that are not to be found in one and the same person, still less in poor school drop-outs. Hence a liaison agent is an essential component of a production system. With the help and co-operation of Don Boscos liaison agents, the research institute has been able to market components and materials of high quality produced by the entrepreneurs.

The school enterprises manufacture auto parts for big car companies such as the Hindustan Motors. The other products include fabricated materials such as gates, grills, windows, rolling shutters, and wheelbarrows. Plastic and nylon moulded materials, both for industrial production and the household utility market, are on the increase. A special computer course, conducted in collaboration with the National Institute for Hearing Handicapped, trains youth for employment in offices and local banks, etc. where a reserved job quota is made available to the trained handicapped. Wool-knitting training is offered to girl school drop-outs in the age group from 16 to 25. Housewives, mothers and widows from poor families are also trained under experts. This has promoted the growth of a wool-garment home industry in the village. Each trainee in the village is equipped with a machine financed by the local bank. Family members co-operate with one another in this income-generating and bread-winning activity. Young schoolgirl drop-outs are engaged in the production of uniforms for schools and factories in and around Calcutta. Jute fibre pro-

ducts are also catching up as they offer an environment-friendly packaging material. With the help of the Jute Manufacturers Development Council, the Ministry of Textiles and the UNDP, the institute and ex-trainees are producing shopping bags, beach bags, doormats and jute fabric garments for international markets

Marketing outlets include casual off-hand sales, regular tie-ups with professional marketing houses in the country who have agreed to sell the products of the institute through their marketing networks, mutual rapport with welfare organisations in and around Calcutta, such as the Calcutta Police Family Welfare Centre, Karuna Women Welfare S.K.I.P. (Skills for Progress), the Association of Private Vocational Training Schools, Rotary and Lions Clubs, etc. as well as public fairs and carnivals where the trainees gain practical skills with regard to bargaining and selling and, finally, door-to-door and footpath sales through licensed hawkers.

As regards outward impact, ex-trainees in air-conditioning and refrigeration are in such great demand that firms have already offered them employment. Young ladies trained in this branch are on the threshold of setting up their own self-employment units. The institute also maintains a sales counter from where visitors and local people can purchase products. Finally, the institute encourages products tailor-made to suit specific requirements.

The institute has reached a stage where graduated boys and girls have started going out and setting up their own tiny enterprises. A few of them have their own place to house the machine. But the greater majority has no place to accommodate their enterprise or shop. A proposal has been formulated to set up a Mini-Industries Estate for these less fortunate ones. In 1986, a small shed was hired and small rooms built wherein these registered small-scale enterprise units were housed.

The Don Bosco Self-Employment Research Institute is a source of help to the youth of the neighbouring community who desperately need a foothold in their struggle for employment and survival. The institute is seven years old. 75% of the trainees are Bangladesh refugees (now permanent settlers) who are eager learners of work culture principles.

With the second phase of this institute starting shortly, it is hoped to provide training facilities in 25 income-generating trades to the needy youth. For those who have passed the 10th class, but have no means to go ahead, the institute offers a new course of studies known as Certificate of Vocational Education (CVE) which is a formal course under the Government Programme. It includes courses in building construction technician, air-conditioning and refrigeration, and office secretary. In this way, bridges are being built between non-formal education and formal education.

***Industrial Training Institute, Bangalore***

In 1988, the World Bank agreed to assist the Indian government in upgrading and modernising vocational training institutes. The World Bank assisted project included diversification of vocational training into high-technology and self-employment training and support. The principal motivation was the high unemployment level among industrial training institute certificate craftsmen, apprentices and technicians, and the realisation that these graduates must be diverted to self-employment. The self-employment component of the project was designed with the following criteria:

- It would be for those who have successfully completed training courses.
- It would emphasise practical production work during the training phase.
- It would be implemented by the existing vocational training institutes (VTI).
- It would cover demand based trades such as scooter and motor mechanics, spray painting and tyre retreading.
- It would consist of intensive part-time training for three to six months only, with 12 trainees per programme, under the guidance of part-time instructors from industry.
- It would include a module of entrepreneurship training.

The project was launched in 1988 for 95 vocational training institutes. Though the target was set at 4,170 trainees, in the subsequent five years only 228 trainees were admitted in 18 vocational training institutes. The remaining 77 VTIs did not participate.

One of the participating VTIs, Industrial Training Institute (ITI) Bangalore was evaluated to ascertain the reasons for this disappointing performance.[17] Training capacities were not fully utilised because of the lack of candidates who could pass the prescribed eligibility criteria (completed ITI and obtained a certificate). The Vocational Training Institute did not have the adequate flexibility and autonomy in decision-making in order to restructure its courses and to be responsive to the local needs. Entrepreneurship training and small-business courses were not introduced as an integral part of the standard curriculum of vocational training institutes. No follow-up assistance was provided. No stipends were given. The ITI could not get anyone

17 Awasthi, Dinesh N., 1996

from industry and delivered self-employment training using its own resources.

In the light of these failures, the author of the study points out the need to review the curriculum which consists of 26 components to be imparted in just 25 hours. Vocational training institutes will have to devote significant resources to follow-up, including strong networking with government agencies, banks and other organisations in the enterprise support system. They will have to explore alternative sources of funding, such as through the setting up of business centres with vocational training institutes, as the government may find it difficult to provide sufficient levels of support for self-employment promotion within VTIs.[18]

## 2.3 Indonesia

***Technical College of Wood Technology, Semarang***

In 1956, the Jesuit Order set up a carpentry/joinery centre at a mission station in Central Java. By 1970 that enterprise had evolved into the 'Technical College of Wood Technology' (PIKA). Since 1963, it has been managed by the Swiss master carpenter, Paul Wiederkehr, although, at present, the school is run mainly by Indonesian experts.

The school offers a four-year training in learning workshops for about 120 apprentices, and a two-year training to 30 foreman trainees. Specialised teacher training is offered to five to seven teachers in three to twelve-month courses. Upgrading courses are offered in modern technologies for employees of local industries, e.g., in surface treatment, upholstering, machining and wood drying/ seasoning. The school enterprise has 65 workers and salaried employees in which the 4th-year apprentices take their practical experience.

The school specialises exclusively in the vocational field of wood technology. The PIKA curriculum is comprised of general and vocational subjects. The four-year course of vocational training is comprised of basic vocational training in the training workshop, specialised vocational training in the training workshop and school enterprise, and practical training in the production enterprise, and, finally, continuing vocational training for apprentices, which is voluntary and subject to competitive selection.

Basic training begins with a systematic three-month introductory course in the methods of wood processing. Two projects are conducted at the end of the course. Specialised training is project oriented; i.e., the trainees make marketable articles that correspond to their learning objectives and their relevant training levels. Forty percent of the products are standard items and 60 percent are job orders. Performance tests measure achievements against learning goals. In the second and third years of training, importance is attached to enhancing the trainees' capacity for self-study, especially with regard to constructional ideas, design inputs and the composition of work groups, thus increasing independence in the execution of work. In the fourth year, the apprentices are integrated into the school enterprise in order to become familiar with the realities of the working world while applying their newly acquired skills toward helping to earn the school's income. Upon successful completion of all four years, the students receive a diploma.

Learning is not directly related to production at the basic level. However, this does not mean that the school follows a rigid training-course programme. For example, the basic trainees make tools for their own use. The specialised level involves project work with the requisite theoretical preparations and follow up. Theoretical instruction takes place at several levels. In addition to drafting and technological subjects, which are organised out of the practical part, theory appears to be the focus during workshop practice. The students learn on products, which are produced for the domestic market. The school enterprise, with 65 specialists, produces high-quality furniture and interior furnishings. The profits serve to finance the school. In the school enterprise, the students undergo practical training.

Both basic and specialised training initially concentrate on the transmission of vocational skills at the individual level; gradually they introduce various forms of teamwork in accordance with the job order situation. There are permanent teams for standard work and teams of varying composition for interior finishing work.

The average age of the new trainee is 17. The minimum level of education is typically lower secondary school, i.e., six years of primary school and three years of secondary school. Each applicant is required to take an aptitude test comprising of a written examination (language and mathematics), interview and drawing test. The training and production institute is comprised of 71% Catholics, 17% Protestants, 10% Muslims and 3% Buddhists. Trainees are highly motivated, resulting from careful selection, high-quality training, and career development prospects. A key factor of trainee motivation is the teachers' technical competence and commitment to the students and their problems. About 95% of the school's full-time

18 Ibid.

teachers are recruited from the PIKA alumni; their training therefore reflects the school's standards and includes courses in didactics and methodology. As far as possible, each teacher is sent for upgrading at two-year intervals.

The school has a number of student, parent, teacher and union-like worker associations, which meet at regular intervals and discuss training matters and social affairs. The social element is especially important, since about one quarter of the trainees come from socially disadvantaged families.

PIKA has developed two focal points of production: the interior finishing of residential, office and administration buildings, and the construction of high-quality residential furniture. 65% are customer orders and 45% are market orders. The equipment in the training workshop consist of traditional Indonesian carpenters' benches. These are used in the basic training phase to help the apprentices identify with their local experience. The school enterprise is geared to serial production. The essential work (machining and joining) is done by graduates from the institute. Semi-skilled workers are employed mainly for follow-up operations such as fine grinding, as well as for storekeeping, packaging and dispatching/transportation. The planning groups control the planning of products and work processes, while the training workshops and production units are responsible for the actual production. A special production-control group ensures that the products are of good marketable quality. Personal computers have been installed for use in the staffs' planning work. In these planning groups, participatory methods are used. Design teams comprising of one teacher and two representatives from production and training are responsible for the purposes of innovating new products such as seats for physically handicapped children and for improving the work organisation.

PIKA maintains close ties with industry and the national market. This facilitates the acquisition of orders and a fairly accurate assessment of what the consumer wants and the market has to offer. The school's close ties to trades and industry are its main avenues of sales development. Advertising and public relation are important elements of sales promotion. As an active member of the Indonesian Carpenters' Association, PIKA maintains close ties with indigenous companies.

PIKA also offers consultancy services and training courses. Many companies consult the school for advice on planning the expansion and modernisation of their production facilities, particularly with regard to new machines. PIKA has been co-operating for a decade now with a Wikrama Putra orphanage in Ngalien, offering courses in woodworking, textile processing and typing. It also provides a home for doubly handicapped children. All wooden repair work required at the Java Save the Children (SOS) children's village is performed free of charge by PIKA. Whenever a new school is being established, PIKA offers practical assistance.

PIKA runs courses in mechanised wood processing on behalf of the Ministry of Industry, and was commissioned by the Ministry of Education to draw up curricula for the relevant departments of Indonesia's lower secondary technical schools. PIKA has published 16 textbooks for use in the subjects of wood technology, drafting, and furniture design, some of which are now in their third or fourth editions. PIKA is also dedicated to the advancement of small and medium-size handicraft enterprises via the technical and commercial upgrading of the sector's future employees. The duration and breadth of training and guidance in theory-based working methods are specifically geared to those technical cadres.

As regards the employment benefits from the school enterprise, PIKA graduates seldom have problems finding jobs. In fact, many companies try to recruit future PIKA graduates even before they finish school. Teachers are often enticed by private firms through higher emoluments than those afforded by the school enterprise. About 95% of all PIKA graduates find employment in trades and industry, 15% become self-employed entrepreneurs, 15% teachers and instructors, 15% become sales representatives for wood-processing machines, paint-spraying apparatus and building materials. The drop-out rate is low (2%) over the entire four years of training.

One major problem is that the spread of such schools appears to be hampered by the small number of graduates and the long duration of training. The other problem is the foreign, mainly western, character of the designs and interior decorations. Also few girls tend to remain in the employment market after their training. The major teaching problem is that the students are not used to learning in a self-directed and active manner.

The school is independent of government funding. The teachers, the institution and the working costs of the enterprise are financed through production of goods and services. The school receives Dutch and Swiss personnel aid. In future, the only foreign aid will be confined to the continuing education of the teachers with regard to didactics and teaching methods specific to wood processing and design. The schools initial endowment was provided by the Mission of the Jesuit Order. Swiss development aid brought in

additional funds in 1971-1973 for construction work and outfitting. Misereor and the Zurich based Franz Xavier Foundation supported further expansion of the school, the former with the help of substantial subsidies from the German Federal Ministry for Economic Co-operation and Development.

## 2.4 Papua New Guinea

***Vocational Centres***

In Papua New Guinea, most institutional vocational training is offered by nearly 100 vocational centres within the national education system. In the mid-1980s they had some 6500 trainees that made up 0.7% of the population aged 12-25.[19] In the system, vocational centre training is an alternative to post-primary liberal arts education at lower secondary levels which reaches 5.3% of the 12-25 age group. It aims to provide two years of production-oriented training in trade, craft, domestic and business skills, with or without basic education. Its students are mainly primary graduates who are either drop-outs from secondary school, or else were not selected for the secondary school.

The administration of vocational education is the responsibility of the provincial governments, while the National Department of Education controls teacher training and registration, inspections, overall policy, planning and capital investments. Finance for salaries, and some capital investment, is administered by the provinces from the minimum unconditional grant awarded to each province from the central government. Vocational centres are also expected to generate income to cover operating and recurrent expenditures. In contrast to other sectors of the education system, the vocational education curriculum development is the main responsibility of the provinces and the vocational centres.

The majority of vocational centres in Papua New Guinea represent a simple training structure; i.e., offer only few occupational specialisations: woodwork, agricultural products, metalwork and mechanics, food processing, craft work, and business management. Locally specific training is especially pronounced in the production of cash-crops. This includes instruction in cacao production and processing.

All the training is oriented directly or indirectly to market production. The extent to which practical training is combined with the transmission of business skills, as well as the didactics of training, varies from centre to centre. Practical experience associated with business management (bookkeeping, accounting, buying, selling) is possible primarily in centres that have stores. The level of training in vocational centres is basic, and dependent on what can be achieved using hand tools and materials available from local markets. Food production is oriented to the production of meals and to meeting centre needs. Craft work includes mainly garment making.

Marketing is carried out either directly from centres or from local markets, depending on the nature of the goods being manufactured. Earnings from the sale of products and services depend entirely on the experience and motivation of teaching and supporting staff; in particular, of centre managers.

The curriculum requirements are diverse within centres. Teaching times and sequences of learning are usually not predetermined as most instructors are carrying out commissioned work. As technology levels are low and there are limited funds for equipment maintenance, teachers have to make the best of their working conditions.

Instructors are trained at an in-service training college. Women with a 10th grade qualification are trained for two years in practical skills, continuing basic education, and instruction in teaching methods. The men, experienced as master tradesmen (grade 10, two years of technical education, three-year apprenticeships, and post-apprenticeship experience) are trained for one year in teaching skills with some exposure to trade skills other than their specialisations. They are paid high-cost, full-time equivalent salaries for this training. Basic educational skills are not taught to them. Some of these men have taken up this training as the only option after performing unsatisfactorily in previous careers.

Inspectors have responsibility for monitoring vocational centre training across the country. They are responsible for trade skill and cash-crop production training. The women inspectors are usually in charge of food processing and craft work.

There is a popular demand for the pre-employment training offered in the vocational training centres. This has to do with the satisfactory returns against investment and the opportunity cost of such training. There is also evidence of a positive impact of training, in that trainees do make use of the skills they learn. Most trainees with trade-skill training, carpentry and mechanics find employment in local firms or family businesses. Trainees from the agricultural courses are known to establish small businesses in their own communities, many of which are, however, short-lived on account of the lack of community support, the lack of graduate maturity and experience as well as the lack

19 Preston, R., 1993

of external seed money. Women are less likely to attain employment than men. The majority of women are in villages or living at home and are involved in domestic work, typing, or work in hotels. Some have taken on leadership roles in the community organisations. Through the training of women in craft work and food production, women have been able to produce a surplus from subsistence work. The skills are also used for undertaking the repair of school buildings.

## 2.5 Germany

***MAN Salzgitter***

The MAN Salzgitter model[20], as it has come to be referred to, has a long history. In 1974, a didactic model for imparting basic vocational competencies was developed in MAN Salzgitter (a Germany company) in co-operation with the Federal Institute for Vocational Training, Germany.[21] It was an attempt to find a clear didactic alternative to the existing course model of vocational education in the transmission of basic competencies. It included principles of total learning and self-directed training. It proposed project instruction as a didactic model for imparting basic vocational competencies. 'Vocational competencies' included specialised technical competencies as well as generalized competencies, such as social, communicative and didactic competencies. The generalized competencies are presently being discussed under the category 'key qualifications'. At the time of their inception, however, the terms were used to describe generalised competencies such as the ability for creative thinking, problem-solving and group-oriented action as integral components of vocational qualifications for secondary pupils.

Through the translation of these generalised competencies into learning goals, it was possible to promote a strong base for the trainees' further learning when seen from the longitudinal career perspective of youngsters as well as from the point of view of providing a greater scope of entry into a broader cross-section of occupations. People had greater possibilities of adapting in the context of the changing world of work by applying their generalised competencies.

The MAN Salzgitter model has ushered in a new debate relating to the appropriate social profile of a new specialised worker who participates in a cluster of autonomous work tasks with respect to self-directed and team-directed solutions to vocational, social, and communicative problems. This approach to basic vocational competencies, since 1987, has resulted in a new ordering of occupational fields and occupational groupings which are not only viewed in terms of specialised technical skills. The new social profile is a constitutive characteristic of the specialised worker and has contributed to overcoming the narrow description of the factory worker as practised under Taylorism.

The MAN Salzgitter model has used this basic conceptual understanding of vocational competencies in finding an alternative to the traditional course method, dominant in classical vocational training, in which learning sequences are additive and predetermined, and in which learning places a high value on repetition. In contrast, project learning was proposed, in which learning places value on open and participatory problem-solving, application, market value and sense of work.

In the context of the history of the theory of vocational education, there has been no dearth of attempts to go beyond the classificatory learning model to the integrative learning model such as project-oriented instruction and planning exercises. Complex forms of integrated learning organisations are however faced with several inherent weaknesses. The course of learning is difficult to plan and implement, the project results often do not meet the expectations of all participants and, above all, it is not possible to conduct a strict evaluation of an individual's performance. The social conflicts between the group members and the teaching personnel can often be considerable. The fact that these systems provide very little regulation is an important reason why such learning systems have not been realised. Teachers find them complicated, time-consuming and difficult to evaluate and, finally, the employment world does not know what to expect from graduates. Furthermore, private employers can make little sense of participation and autonomy, especially when they have been used to expecting adaptation and obedience from graduates of vocational institutions. The new method of learning and behaviour must, therefore, first of all find acceptance among teachers and private employers alike.

The MAN Salzgitter model proposes further that, with regard to the process of operationalisation of the integrated organisation of learning, due attention should be given to the learning content and the trainees, and to the specific competencies of teachers and instructors. For example, while it is better to classify the complex reality when new contents are being considered, it is advisable to work with the principle of integrating complex knowledge when dealing with trainees that are at an advanced stage of learning. Where courses deal with teaching the basic processes and the basic

20 MAN, Maschinenfabrik Augsburg Nürnberg is a German company for the construction of machines

21 Wiemann, G., 1974

technical competencies, it may be easier to agree on organising learning around the classificatory method of learning. For example, courses relating to the functioning of a lathe may be organised around turning, moulding, sharpening, scraping and drilling. Courses dealing with core skills such as instruction in technology and technical mathematics may also be organised around additive, linear and classificatory principles.

Both these methods of learning may be termed 'closed' and 'open' respectively. In classificatory forms of learning, the learning goals and paths as well as the learning results are closed or predetermined. In integrated systems, only the learning goals are predetermined; the learning paths which lead to the solution of problems as well as the learning results are open.

*Lathe Machines for Indonesia*

In connection with a research project, a small group of German scientists from MAN Salzgitter's Vocational Training Institute visited the Technical College of Wood Technology (PIKA), Semarang. The educational and economic success of this school enterprise has been due to its autonomous orientation with regard to recruitment of teachers, selection of curriculum and of products. An attempt is being made to promote traditional Indonesian wooden crafts and designs in this school enterprise. The basic training stage includes working with indigenous tools and work benches. Introduction to modern production methods begins only at a later training stage. The trainees are encouraged to revive the products and crafts of daily use which were traditionally made in home production. This initiative is rewarded through higher credits. These efforts aim at countering the effects of the colonial epoch, during which cheap imports from Republic of Taiwan and Korea destroyed a good part of home production in traditional crafts.

The lathe machines from MAN Salzgitter meant for the Technical Institute of Wood Technology aim to revive traditional designs in wood work.

After developing a prototype of the machine, a series of ten machines were delivered by the project group from MAN Salzgitter to the Technical College of Wood Technology. The project group was responsible for settling all technical, economic and sales aspects with its clientele, the Technical College of Wood Technology, and discussing matters relating to the installing of the machines, the tropical conditions, the delivery and the custom clearance. The project group travelled all the way to Java in order to introduce the machines and to advice on the instructions for their use. The travel costs were borne by the project group itself which is independent from state funds and entirely dependent on itself for its own existence.

The openness of a learning organisation means participation of the learning group in the evaluation of the learning results. In other words, the beneficiaries of training participate in the decisions regarding the outcome of the project, both with regard to their own needs, as well as with regard to the needs of the institute or for a social purpose. In the project 'Lathe Machine', the project group MAN delivered/transferred the project results to the Technical College of Wood Technology in Indonesia.

The dominant idea behind vocational education under the MAN Salzgitter model was the concept of self-directed learning. This model was, however, expanded in order to incorporate new competency requirements of production enterprises in the context of the changing world of work. The concept of self-directed learning was extended to include the concepts of team work, process-directed learning in production, and quality control in the work place.

The extension of the didactic concept aimed to resolve the principal conflict between finding solutions to specialised problems which arise as a result of the changing world of work in the production enterprises and the concrete learning structures in training workshops, vocational training institutes and schools. The conflict is most explicit with regard to the designing of linear learning concept (courses and subjects) and their relationship to the authentic structures of production. Through the new didactic approach (such as project instruction), this conflict is however only partly resolved. Therefore, a further extension of the MAN Salzgitter model was proposed: this included 'simulation' or approximation of real work processes in vocational training.

In the project 'Lathe Machines for Indonesia' the learning concept is taken one step further: taken out of its simulated context and incorporated into a real clientele-oriented market situation. An attempt has therefore been made to combine 'production for the market' with vocational learning, even though the two situations are inherently contradictory. This new didactic model combines innovation, construction, production and vocational learning through the concept of school enterprise.

With regard to the project 'Lathe Machines for Indonesia', the first step in the learning process includes the creative construction of a lathe machine; the second step entails the monitoring of serial production. Both these steps are accompanied by an orientation to the prospective clientele and is translated into its

market value. All stages are conducted through monitoring by the individual and group.

The above mentioned didactic elements are incorporated in the MAN approach to combining education with production. These include the development of a prototype (innovation), the production and improvement of the prototype (construction), the serial production of 10 machines (production) and, finally, the orientation to an international market.

The international orientation includes three elements. Firstly, the members of the project group from MAN Salzgitter come from four different countries (Kazakhstan, Herzegovina, Greece and Germany). Secondly, the aim is to establish a permanent exchange between the project group from MAN and the clientele in Indonesia with regard to setting and co-ordinating goals, and the improvement and delivery of hardware and software. Thirdly, the testing of technical and didactic material was done in Brandenburg (Germany), Bromberg (Poland) and Moscow (Russian Federation).

Vocational training at the MAN Salzgitter school enterprise is conducted in three stages:

1. Basic vocational training (in metal trades and techniques) in the vocational training school in Fredenberg. Learning methods include course work method and subsequently integrated projects;
2. Specialised vocational training in the training centre at MAN Salzgitter. The didactic concept used at this training stage is project training, i.e., in-house project and out-house project for the market (example: Lathe Machines for Indonesia);
3. Specialised vocational training in a productive enterprise. The didactic concept includes practical training in the workplace (private enterprise) accompanied by reflection in the training centre at MAN Salzgitter.

The training stages therefore combine course-oriented vocational instruction and project-oriented instruction with on-the-job training in a private enterprise. The acquisition of technical, social and planning competencies is the focus of basic and specialised learning goals. At the advanced level (the third level) importance is given to those learning goals which emphasise practical action and application of competencies for employment and social mobility.

The project 'Lathe Machines for Indonesia' is situated in-between the simulative and authentic learning systems. Through the project 'Lathe Machines for Indonesia', the training workshop is at the watershed of transition from training workshop to a school-run enterprise. It is an autonomous profit-making unit. The production of lathe machines for the international market is a first step towards autonomous market production as a decisive component of MAN training. This has to do with solid economic reasons. But the central driving force has been a didactic one, i.e., the attempt to draw closer to authentic learning structures which have direct relevance to real work processes without giving up claims to classical didactic systems of vocational education and training.

The MAN Salzgitter model provides an interesting contrast to the technician school that forms part of the official development co-operation of the Federal Republic of Germany. These technician schools ('Gewerbeschulen' or 'Berufsfachschulen') were supposed to be superior to the existing industrial training institutes and polytechnics in developing countries due to their close links to the requirements of the enterprise and the emphasis on practical training which is part of the famous dual system of vocational education in Germany.[22]

However, by the middle of the 70s it became clear, that the transplantation of model technical schools in developing countries did not have the intended multiplier effect. On the contrary, many conceptual weakness came to the fore: for example, those concerning costs, bureaucratisation, disconnected from the working reality in an enterprise, and insufficient preparation and motivation of the students to find solutions to the complex requirements of the world of occupations and work.

## 2.6 Botswana

***The Botswana Brigades***

The Botswana Brigades are autonomous, community-based and government aided school-run enterprises. They engage in three main activities:

- vocational training,
- income-generating production,
- community development and extension work.

The average number of trainees in a Brigade is 106. Currently there are 33 Brigades operating throughout Botswana.

Training is provided in 16 different trades, such as building, carpentry, textiles, office skills, general maintenance, computer studies and business studies.

22 The dual system of technical and vocational education is a archetypal form of co-operation between public vocational training institutions and productive enterprises. The German dual system also combines learning with ongoing participation in a separate productive enterprise. The instructors are responsible for the production process and for the training but are not involved in the economic activities.

The first Brigade was formed in Serowe in 1965 through the efforts of Patrick van Rensburg, then Principal of Swaneng Hill School. Young primary school-leavers who did not get a place in secondary schools formed the core of the trainees. The school enterprises of the Brigades were an attempt to deal with the primary school-leaver problem by giving training in a trade that would be of immediate benefit to the trainees as well as to the local community.

The training is a mixture of practical, theoretical and on-the-job training. Combining education with production is more than a pedagogical technique; it is also a way to help offset the costs of training. Proceeds from the production efforts go towards the development and expansion of the Brigades. In addition, students and their instructors participate in the construction of their own training facilities such as classrooms, kitchens, workshops and hostels. In the true sense of the word, they learn to engage in productive and economic activities.

The success of the first Builders Brigade in Serowe, where the Brigades movement started, has not so much to do with government initiative and effort, but with individual local communities. The idea spread because it worked, and the community leaders saw the benefit to their communities. Income from the trainees' production was their main source of revenue to cover the cost of training. In 1975, the government began to subsidise training. Currently, it provides the existing and new Brigades with a financial subsidy in support of their approved training programmes, calculated on per capita basis.

While the government has increased its financial contribution and technical assistance, the Brigades themselves remain locally controlled and autonomous institutions. They are registered under the trust laws of Botswana known as Brigades Development Trusts. A Board of Trustees, made up of representatives from the community, staff and trainees, nominees of the Minister for Education, and ex-officio members such as the local District Officer, oversees the operation of the school enterprises.

Training duration is either two or three years in length depending on the level of basic education of the participants. The curriculum is under constant evaluation given the increasing need for better trained craft workers and artisans at all levels. There is an increasing demand for a greater diversification of training programmes as well as for a higher level of training. The introduction by the government of a nine-year basic education programme for all – ten years from 1996 – has shifted the focus of the Brigades from Class VII leavers to junior secondary leavers. Since the Brigades' students now enter training with a longer basic education, its standards can be elevated and curricula can be revised to take advantage of the more advanced trainees. As regards the organisational model, the executive secretary is in charge of all management functions and reports to the board of trustees. A training co-ordinator is in charge of all training activities and unit managers are in charge of all production activities. Close communication between these officials is essential for optimal pedagogical benefits from production-cum-training. Business managers in charge of finance and accounting also offer financial advice and marketing assistance to the unit managers.

Production and commercial services account for almost 76% of the total income of 11.3 million US$. The remaining 2.7 million consist of the government training subsidy, production income from training activities, school fees and donor contributions.

Apart from the pure transfer of skills through production, the trainees learn basic life skills such as positive attitudes towards work.

The Brigades graduates have a much better chance than their counterparts from other institutions. They are trained to work, are more committed, and are not afraid to get their hands dirty.

Economic conditions have changed considerably since their inception. When they began they were generally the only providers, especially in rural areas, of goods, services, employment and training. Today, Botswana has a more and more diversified commercial base. Small- and medium-scale enterprises are making themselves felt even in rural areas. In many places, the Brigades are no longer the sole providers of goods and services. They have to compete with private business and must be concerned with costs as well as marketing. Without advanced business skills among Brigade managers, Brigades may fall behind their competitors with the consequence that the central concept of training with production will suffer.

In addition to this, the private business community has already expressed concern about the Brigades as competitors in local markets. They argue that this is unfair competition since the Brigades are state-subsidised institutions.

The continued operation of these community-based institutions has to do with the recognition by the government that the Brigades form an integral part of the vocational training system in Botswana. The private sector has not yet developed the necessary training capacity for an appreciable number of school-

leavers. As the cost in resources is just too high, it is not possible for the government to fill this gap through full-time school-based training using formal vocational models.

## 2.7 Kenya and Ghana

***Small Business Centres in Vocational Training Institutes in Kenya and Ghana***

The Kenyan government, with the assistance of the United Nations Development Programme (UNDP) and the International Labour Organization (ILO) has made efforts to introduce entrepreneurship awareness to many vocational training institute students. The major objective is to direct graduates towards self-employment as a viable alternative to formal employment. Small Business Centres (SBC) have been set up in several vocational training institutes to promote small-enterprise development. At present, UNDP/ ILO is sponsoring ten selected Small Business Centres. It has been recognised that due to the short period of training, the lack of practical skills among instructors, and the artificial setting of the training, the skills acquired by the Small Business Centres trainees will be limited. Hence, some form of internship through traditional apprenticeship might help improve the level of entrepreneurship training.[23]

The Ghana National Association of Garages organises and manages the apprenticeship programme until the apprentices qualify to go for further training at Kumasi Technical Institute (KTI). The apprenticeship lasts four years. The KTI programme for apprentices is twelve weeks and that for master mechanics is six weeks. A programme on management and entrepreneurial skills is managed by Management Development and Productivity Institute (MDPI).[24]

The Small Business Centres in Kenya and Ghana have made possible the co-operation between vocational training institutes and traditional apprenticeships. The vocational training institutes can co-opt the low cost work environment of the informal sector to enhance their students training and preparation for self-employment and, through thoughtful and flexible programming, the vocational training institutes offer useful courses to upgrade the training and productive skills of the apprentice masters. Both vocational training institutes and traditional apprenticeships have been made to converge in order to impart productive skills for the local economy.

## 2.8 Algeria

***The Offices for Practical Works in Vocational Training***

These centres[25] are created specifically for aiding production activities in vocational training centres. They act as an intermediary between enterprises which demand products and the vocational training centres which provide them. They aim at identifying requirements from enterprises, particularly when the demand for products required is too large to be met by only one vocational centre; discussing and fixing prices and deadlines; distributing the total demand among the various centres, taking into account their production capacity; and providing them with raw materials.

The most positive aspect of this experiment is that it takes advantage of an 'economy of scale' in gathering demand from many different sources and production from many small suppliers. In addition, by ordering a great amount of raw materials, they can obtain better prices and reduce production costs. The main problem is that production and trading concerns very often tend to prevail over pedagogical interests. This leads to trainees having to work on repetitive and monotonous productions in which the pedagogical dimension is not usually very important.[26]

## 2.9 Cuba and Costa Rica

Vocational training and education for employment in the modern sector is the main task of the government vocational training institutions in Latin America. Their training centres have primarily offered formal vocational training courses in the classical industrial skills, lasting up to three years, and addressing primarily urban youngsters aged between 14 and 20. The enrolment requirement is secondary school education. In view of the high percentage of secondary school graduates among young people, this does not appear to be a very restrictive formal barrier. However, a particular problem of government vocational training centres is that the training very often fails to meet the skill requirements in both the modern and the informal sector. A growing number of graduates end up often as unemployed or underemployed in the informal sector because they cannot find employment in modern industrial enterprises. At the same time, the graduates are out of touch with the working conditions and technical possibilities in small and micro-enterprises and the graduates are not trained to use simple technologies or to cope with the negative institutional factors existing in the informal sector.

23 Ferej, A., 1996, pp. 104-105
24 Abban, C. K. and Quarshie, J. P., 1996
25 Offices des Travaux d'Application de la Formation Professionnelle (OTRAFORM)
26 Cabral de Andrade, Antonio, 1990, pp. 253-267

In view of this situation, some vocational training institutions in the mid-1970s extended their focus by offering non-formal training courses to improve employment opportunities also for persons from the informal sector.[27] However, despite the different objectives and target group orientation, training curricula remains mostly oriented to the classical vocational profiles.

***The National Pioneer Centre Havana, Cuba***

The National Pioneer Centre at Havana operates as a major vocational counselling centre. It is organised on the basis of 17 broad fields of activities and 234 specialisations. For each speciality there is a production unit operating under conditions very close to those prevailing in actual enterprises: a small hotel, a restaurant, a radio and television studio, a data processing centre, a sugar production plant, units manufacturing products based on sugar cane, a farm etc. Each student spends six months on each specialisation, which means that in the course of the total four-year period of attendance at the National Centre, he can make contact with and work on eight specialisations. Each production unit receives materials and technical assistance from the ministry or service concerned. The National Pioneer Centre has contributed to a more conscious choice of the line of studies to be pursued in the educational system and, later, of the kind of occupation or profession taken up by students, thus minimising the losses due to cases of drop-outs or changes of career, etc. It has also promoted easier adjustment to later work.

Mono-technical schools is an interesting pattern within the regular secondary system. They usually cater to a well-defined market slice and keep very intimate relationships with the firms for whom they produce skilled labour and technicians. There are examples where hotel and catering schools and beauty parlour schools are operated by vocational training institutions. Such enterprises exist in most of the Latin American countries, such as Brazil, Uruguay and Columbia, and are called Pedagogical Teaching Enterprises.[28] The trainees undertake a period of internship in these enterprises, which offer their services to the general public. The proceeds from these services are paid to the vocational training institutions to which the enterprise in question is attached. As a general rule, the operating costs of these enterprises are very high and the earnings from the sale of services are an insufficient compensation.

***The Training-cum-Production Workshops 'Talleres Públicos', Costa Rica***

The public Training-cum-Production Workshops in peripheral urban areas and small rural towns in Costa Rica is sponsored by the National Institute of Apprenticeship – INA.[29] The notion of public workshops was a reaction to the dissatisfaction with existing training methods in technical and vocational education institutions which were oriented to the modern sector of the economy.

In 1981, the National Institute of Apprenticeship (INA) set up multi-purpose workshops. Some 20 workshops provided training to 20,000 persons annually. The trainees – men and women, of all ages (from the age of 12 onward, also without any school education) – are taught how to make articles they need for their own use for selling in the market. On completion of the training period, the trainees are encouraged to form co-operatives, partnerships or mini-businesses for developing productive activities. The trainees have the possibility to participate in a technical training which is purpose-oriented with regard to their realistic occupation opportunities in wage or self-employment as well as in the subsistence sector. The training is adapted to the learning opportunities and potentials of the trainees. The main advantage of this experiment is its flexibility on the one hand, and a high motivation for learning on the other. Trainees have to make a time-wise (flexible) commitment to attend a minimum number of hours per month.

The skill training offered and the type of equipment provided are decided for each 'public workshop' with respect to the local qualification needs and labour demand, as identified beforehand by the INA. The objective of the technical training is to qualify the participants in order that they are better able to meet their basic needs and thus perhaps reduce their family's need for cash income. A further objective is to promote the setting up of small co-operative businesses, promote self-employment and the improvement of commercial home production, the latter especially aimed for women. A final objective is to promote industrial vocation-oriented training courses qualifying persons for a wage-earning employment in the modern or in the informal sector.

The training by local INA trainers takes place at two basic levels: basic training for unskilled workers, as well as further training for producers. Basic training is conducted either as individual advice upon request or in group work. As regards further training, small producers are allowed, after a simple test, to use the tools and equipment of the workshop for a small fee.

27 Arnold, R., 1989, pp. 50-68
28 Cabral de Andrade, A., 1990
29 Ibid

Instructors are available to encourage users to perfect their skills and improve their technology. The producers are expected to buy their own materials and sell the finished products.

The 'Talleres Públicos' often operate less as training centres, but indeed more as 'public workshops', where people with sufficient technical skills but no suitable tools use the equipment available at the workshops free-of-charge. In this function, these workshops are extremely useful, especially in areas with few artisanal workshops. The main problems are linked with people who attend the workshop only to produce, without needing to be trained. They utilise, on a permanent basis, part of the workshop's capacity, preventing other potential trainees from having access to training. This experiment has been less successful in its attempt at creating co-operatives, partnerships and mini-business.

Yet, given a more stringent selection of beneficiaries so as to reach workers from the informal sector, the public workshops seem to be an interesting way of providing training and technical assistance for small producers.

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# 3 Conclusions and Guidelines

Several approaches of combining learning with market production have come to exist side by side within a country. Many programmes have had to be reconsidered within the framework of a diversified secondary education. There is also evidence of a situation whereby various traditions and orientations come together and evolve into a new approach. Reconsideration in light of changing needs and resource availability is an inevitable and ongoing part of the process of educational change. The diversity of school enterprises in the context of a single country is indicative of the freedom that now exists for schools to develop their own initiatives, and of the status and importance of school enterprise concepts in schools.

This section presents conclusions and guidelines drawn from the case studies on school enterprises. The issues to be discussed include the organisational form of school enterprises, their learning organisation, learning outcomes, support infrastructure, curricular processes, integration of production processes in the curricula, teaching staff, external relations, the economic and social impact of school enterprises, the regulatory framework, financial options for school enterprises, and the role of state and non-governmental agencies in the management and financing of school enterprises.

## 3.1 Rough typology of school enterprises

A basic principle of school enterprise is the careful balancing of educational outcomes and the economic output. The case studies represent examples of the balance that has been reached, giving adequate attention to market, enterprise, profit and income-generating capacity while, at the same time, acknowledging the primacy of imparting related specialised technical and general competencies (knowledge, skills, attitudes and values) directly linked to employment.

School enterprises can be roughly classified in terms of those that

1. give priority to economic goals;
2. give priority to educational goals; and
3. those that attempt to reach a balance between economic and educational considerations.

**Placing priority on economic goals**

The economic and financial situation of many school enterprises may require that priority be given to production goals. The recruitment of instructors from enterprises and the resulting socialisation problems concerning patterns of thinking and behaviour can also bring about a situation in which school enterprises are dominated by economic considerations. The pressure exerted by the partner enterprises to achieve specific market goals with the help of the school enterprise may be another factor that creates a situation in which economic considerations may dominate. In some of the Chinese examples there is a growing tendency to employ professional workers in addition to students in order to meet the quality demands of the market.

**Placing priority on educational goals**

On the other hand, the learning climate in a school enterprise, the prevalence of curricula and examinations, and the socialisation of teaching staff (recruited from higher education institutions) can bring about a situation in which learning dominates while production is neglected. There are, however, only a few examples which indicate this trend.

**Balance between economic and educational considerations**

Case studies have shown that most school enterprises have evolved diverse approaches to reaching a balance between economic, financial and educational goals. For example, in Indian case studies, some school enterprises have adopted the notion of the semi-com-

mercial enterprise. According to this notion, the training of students is given priority in the management of school enterprises. In normal circumstances, the school enterprises would gain some profit, which is good in itself. Yet the pursuit of profit is not taken as the major purpose of such enterprises as it would interfere with the fundamental goal of training students.

In the Indonesian example, the outcome is separation of training and market production. In this variation, the balance between economic and educational consideration can be reached when the school's production unit produces the quantity that can be sold in the market, whereas the teaching workshop produces the quantity (for market and internal needs of the school) that is required for teaching and practising. Production for the market is used as a vehicle to reach the complete learning goals, i.e., a learning situation is created that exists in the context of genuine production for the market – one that is conducive to learning complex behavioural patterns, gathering relevant experience and dealing with it in an abstract, reflexive manner.

The challenge of the Botswana Brigades is also to find ways to optimise production while providing training opportunities. Since some repetitive production processes lose their training value very quickly, some Brigades have hired permanent production workers to handle routine jobs. Trainees participate only in tasks where the training benefit is high.

## 3.2 Structures of school enterprises

A wide diversity of structures and focus is to be found in programmes of school enterprises, depending on whether production for the market takes place predominantly in an enterprise or in a learning workshop, and whether the learning takes place in a school/training institute or in an enterprise with training functions. The two contexts – learning workshop and enterprise – should be seen as pure institutional forms with a relatively high degree of functional specialisation, but whose nature changes according to the nature and degree of interaction with the other domain. The key conceptual frame is the interaction between learning and production and its location in the curriculum.

Most school-based programmes at the secondary school level combine learning with production in a learning workshop. The emphasis here is on a combined learning and production place. The production division also serves as a training workshop.

In some schools, experiences with the logistics of production, and the continuous dilemma between pedagogic and economics have led to a separation of types of activities. For example, a distinction is made between productive activities as an integral part of certain subjects and workshops where the emphasis would be on developing skills, and production projects which are separate from the curriculum but still provide clear opportunities to apply what was previous learned in workshops and class.[30] Drawing such organisational boundaries, and defining clear objectives, has eased the problem of interference. Training takes place in a training workshop, whereas production takes place in an enterprise, and the two contexts are linked in several ways. The emphasis here is also on the combination of education with production, but production for the market takes place in a separate enterprise attached to the school or training institute.[31] The enterprise serves not only the production of goods and services for the market, but also as a location for application of skills learned in the learning workshops.

## 3.3 Organisation of learning

School enterprises incorporate elements from several formal and non-formal modes of organising learning and training for skill development. Formal vocational training is but one way of training. Enterprise-based training, such as on-the-job training, the apprenticeship method and 'attachment learning'[32] are modes of training that complement formal training methods. These refer to an attachment of the learner to the person or agency providing the training. Recent studies have investigated the contribution of these informal processes of learning to skill development and their relevance to future employment.[33] Formal or institutionalised training contributes only in a very small way to skill development and employment in developing countries, especially in the informal sector.

An important function of school enterprises is to supplement on-the-job training. It will be useful therefore to elaborate the main features of the various modes of organising learning and training.

**Enterprise-based learning**

*Apprenticeship method*

The traditional 'apprenticeship' has the following characteristics. A master craftsman takes on one or more trainees to be initiated into his craft, and they work with him under his instruction and guidance. The apprenticeship contract specifies a period of some training during which the apprentice will work for the master craftsman. At the end of that period, the former apprentice becomes a full-fledged journeyman who

30 For example, the schools in Zimbabwe supported by ZIMFEP. Conradie, J.A., 1989

31 Greinert, W.-D. and Wiemann, G., 1993

32 Bowman, M. J. and Anderson, C. A., 1976

33 Singh, M., 1996

can take on his own apprentices. The journeyman provides subsistence for the apprentice and, as he gains in skill and experience, he will receive some pay. Training and production take place within the production enterprise. The organisational structure is therefore determined to a very large extent by the work organisation and technology level of the enterprise. Learning and working are given approximately the same attention and completely integrated with each other.

Traditional apprenticeship systems are essentially vocational-entry arrangements and long-term. Entrants have no considerable prior grounding in general unspecialised school learning.

The trainee learns by the auto-didactic learning method, i.e., the ability to learn through trail and error and learning by doing. He informally imitates what goes on around him in an actual production situation by watching, copying, participating and helping. The trainee enters into social ties with the master providing the training. The work of the trainee is practical and vocationally relevant. It forms the basis of the trainee's own future livelihood. The products can be marketed. Traditional apprenticeships provide an ideal environment for stimulating enterprise networks needed for later self-employment.

In traditional apprenticeships, the same master craftsmen, journeyman or experienced worker responsible for the production process and economic activities also transmits skills and knowledge to the trainees. He also takes orders, negotiates with customers, passes on parts of his own work to the trainee, and plans the work and work sequences, often contributing to the work himself and helping the trainee. He monitors the work and evaluates the work outputs.

The traditional apprenticeship training in the informal sector has been an important way to complement training in business centres of public training institutes in Ghana and Kenya. The case studies from these two countries indicate the volume of training undertaken through traditional apprenticeships despite the acknowledged limitations of the apprentice masters as trainers.

Traditional apprenticeship is not confined to the informal sector. The modern sector also has large numbers of individuals who acquire their skills informally on-the job without support from the formal educational system. There is clearly a merit in expanding the intersection between these two training sectors.[34] It has been shown that communication of the rudiments of business know-how in association with apprenticeship training and participant observation, rural or urban, seems to have been generally successful. On the other hand, business know-how as a complement to school-based or non-formal training is usually both ineffective and expensive.

In developing countries, apprenticeship has often been viewed as an aspect of industry rather than of education. The apprentice in the informal sector is a low-cost labourer ultimately rewarded for years of menial service. The apprentice is indentured and only after the trade skills are acquired can the apprentice become free to travel ('journeyman'). This model of training served industry well when much of the labour needed was unskilled. But today, industry is moving towards requiring a greater need for higher skills. There is a need, therefore, for school enterprises to adopt an apprenticeship model that is not based upon the cheap workforce model of the developing countries informal sector, but instead one in which active learning is designed to develop a variety of process skills in the workforce. Such on-the-job training is recognised as a part of the educational system when it is deliberate rather than accidental. All jobs, where productivity and output and innovation are influenced by experience, have an educational component. Wasted opportunity, lost productivity and diminished profit result when this accidental on-the-job education is ignored.[35]

School enterprises which recognise the role of on-the-job training are those with established apprenticeship programmes. Important dimensions of apprenticeships in school enterprises are:

- Apprenticeships refers to the acquisition of a vocational skill through work under the supervision of established practitioners.
- Apprenticeships vary substantially in duration, covering both artisan and craft skills as well as both commercial and manual skills. In the case of PIKA, the apprenticeship is driven by the fact of the large number of complex moves which must be learned to complete a process. PIKA takes on apprentices who, for example, ultimately are expected to be able to create the organ single-handedly. Others are motivated by a commitment to learning different aspects of the trade. Building trades people, like plumber and electricians, seem committed to this kind of on-the-job training programmes.
- In fully-fledged apprenticeships, attachment to an enterprise continues with utilisation of the increasing skills (manual and commercial skills) acquired over an extended period of learning.

34 Ferej, A., 1996

35 Landgren, C. R., 1993

- Apprenticeship arrangements commonly involve acquisition of skills that have wide applicability, hence are portable across agencies and activities.
- Apprenticeships entail some sort of recognised obligation, formal or informal, on the part of the trainee. The alternative is payment of fees by trainee to master.
- The apprentice model of learning is an effective model of learning in school enterprises, as the rewards for the learned action are substantial. The young learner is the most easily taught. The young apprentice learner learns his basic competency skills in the context of genuine work context. This contrasts with most existing vocational training programmes in which the rewards early on are limited, and in which students are older and have learned the basic competency skills out of context.

*On-the-job training*

Here a distinction is often made between transferable skills in a competitive state and firm-specific skills that reduce the chances of labour turnover. There are similarities between apprenticeship systems and firm-specific on-the-job learning. There are investments by trainees in foregone uses of their own time, whether or not they pay fees, even as there are also costs incurred by the trainers. And there are, in varying degrees, attachment of the learner to the master or to the modern employer. However, unlike traditional apprenticeships, on-the-job training in most large modern enterprises is a continuing process that can upgrade skills, counter obsolescence and prepare for innovations within the enterprise. Employees are given incentives in order to check voluntary turnover, whatever the extent of specialised on-the- job training and learning.

Several problems, including staff recruitment and retention at school enterprises, could be reduced by giving modern firms and informal sector craftsmen a larger role in the training process. By virtue of their closer contact with the market, an employer-operated training could be more efficient in the selection of trades. Less encumbered by formal regulations and bureaucratic procedures, private firms and small enterprises can establish, expand, adapt or discontinue training courses with greater speed and at lower cost. Student motivation to effectively integrate theory with practice is enhanced by greater proximity to the actual working situation and the immediate presence of a prospective employer.

The SENA-type programmes in Latin America were initially established by employer groups to provide off-the-job training and skills upgrading, and large employers were taxed to cover costs of the programme. The linkages with employers ensured relevance in the job markets. These programmes have a variety of components, for both short-term training meant to introduce new but relatively low levels of skills, and for adults who wish to upgrade their skills to apprenticeship levels and long-term programmes for skill training after apprenticeships.[36]

The dual vocational training method is a system in which practical training takes place in workshops of private enterprises, while the corresponding vocational theory training is done in normal, not necessarily government, training centres. In some Latin American countries, the primary objective of the co-operation between the government vocational training institutions and private enterprises is the training of skilled workers for the demand of modern industrial enterprises. In Nigeria, an experiment has been made in introducing the dual system of vocational training by extending informal apprenticeship training in small and micro-enterprises through government organised theory lessons, as well as efforts by the government to introduce certain standards also for informal vocational training in private enterprises.[37]

The idea underlying the dual vocational training is to promote enterprise based vocational training and, at the same time, shift the responsibility for vocational training as far as possible from government-run vocational training institutes to the private sector. It aims to promote a stronger emphasis on practical vocational training in 'real' workshops of private industrial enterprises, and to qualify graduates and make them more compatible to the needs of modern industry. It is hoped ultimately to increase the total number of apprenticeship places as well as the subsequent employment opportunities of the apprentices.

*Critique of in-enterprise training in the formal and informal sectors*

Although there is a strong case for locating training as near as possible to enterprises, it is equally important to realise why it is necessary in the first place to remove training from the hands of entrepreneurs.[38] Wiemann and Greinert refer, in their vocational and pedagogical critique of enterprise-based vocational training, to the structural problems of trying to combine in-enterprise plant operations with the necessities of modern learning.[39] The operational and technological structure of the enterprise is geared to optimising the production of goods such as to satisfy the dictates of market competition rather than being tailored to the necessities of vocational training. The enterprise's business situation is market-dependent

36 Jimenez, E. et al., 1989
37 Boehm, U., 1990
38 King, K. 1985, 43 pp.
39 Greinert, W.-D. and Wiemann, G. 1993

and, hence, limited to the specialisation of only a range of products. This results in an equally limited learning potential. Since the enterprise regards its employees as producers of goods, they are able to cater to the trainees' vocational learning needs only as a side occupation. In view of the permanent pressure from the market, vocational learning is pushed into marginal functions. The method of demonstration and copying has certain disadvantages. The master craftsman, journeyman or experienced worker shows how a product is to be manufactured and the student imitates without questioning. The student learns only what is taught in the production course but is unable to use this knowledge to solve a new problem or produce a new product. Students should be able to experiment with new products which may have a better chance in the market, rather than to orient to the already over-filled demand for certain goods. The introduction of new products in apprenticeship programmes is often confronted with problems, such as high capital requirements and the lengthy training required, which craftsmen can hardly afford even where students pay a fee.

The dual vocational training has also come under critique in its application in developing countries. As regards the training aspect, private enterprises hardly train more apprentices than their own immediate need, let alone employ them after training. Furthermore, many enterprises, especially medium-sized and smaller ones, have difficulties, at least initially, to cope with the requirements related to workshop-based vocational training, not only for internal organisational and financial reasons, but also because of the inadequate number of pedagogical qualified skilled workers who could be assigned the task as instructors. At the same time, external mentors are normally not accepted as instructors on the part of the enterprises to train their workshop staff in dual vocational programmes. They are unlikely to be keen on making their situation even more difficult by taking on young people from the informal sector, who often have low levels of schooling, as apprentices. There will certainly be cases where payment of an apprenticeship grant during the enterprise-based training will enable school graduates to take up formal vocational training. But, on the whole, the dual vocational training provides no better chance for an occupation-oriented qualification than the centre-based formal vocational training since it confronts most persons from the informal sector with just the same formal and de facto formal enrolment restrictions.

The assumption that a shift of the larger part of vocational training into private enterprises would improve the training quality, increase the number of apprenticeships, and open employment opportunities for the graduates may prove to be correct in individual cases. On the whole, however, the number of jobs will only increase if the overall economic development creates a corresponding labour demand.

**Learning organisation outside of genuine work situations**

School enterprises have also incorporated several types of training methods that have evolved for teaching vocational competencies outside of genuine work situations. These basic types include the training course method, practical learning, and the project method. These forms of training have evolved in situations existing outside of the real work process and economically imposed constraints, and constitute an essential form of training conducted in vocational centres, industrial training institutes and off-enterprise training centres.

*Vocational education theory according to the training course method*

Training according to the training course method is expected to supplement the training that is conducted through the production process within school enterprises as well as within enterprises external to the school. It is a method that is crucial for imparting basic vocational competencies in school enterprises.

In school enterprises, the training course method has the aim of transmitting certain course material in a predefined period of time. This entails a detailed planning of the course, keeping in view that the theory elements are directly linked to the practice elements. This contrasts with the traditional training course method which usually concentrates on theory without linking it to practice. Although occupational problems are broken down into learning sequences and structured according to theoretical considerations, they are not completely cut off from the real work context. As instructors are often those who are also involved in the production process and economic activities, the learning is not separate from the work context. In vocational training centres and industrial training institutes with enterprises or business centres attached to them, vocational education theory is usually under the direction of full-time instructors. In such places basic vocational training is normally geared to certain types of learning, e.g. introductory courses in welding, hydraulics, pneumatics, etc.

Unlike the separation of vocational learning and production process in the traditional course method, the attachment of enterprises to training institutes attempts to promote the trainees' relations to the realities of a genuine job situation. The idea is to prevent the trainees' relationship to the genuine job situation from becoming stunted as a result of attending a separate place of learning for too long a time.

The duration of learning through the training course method depends on the learning ability of the trainees. Compared to underachievers requiring much personal attention and continuous support, self-assured, creative achievers find it easier to learn a trade in an on-the-job situation and therefore require less time in basic vocational training courses. It also depends on the type of learning course. Compared to the curricula in woodworking and metalworking with a heavy bias on empirical and experimental work, curricula in electrical trades with a substantial theoretical component are more suitable for teaching through the course method (Wiemann, 1996).

An important advantage of training course learning within school enterprises is to prepare the trainee for a plurality of related vocations and occupations. However this method can become disadvantageous when the learning is dominated by the routinisation of work procedures with respect to the specification of learning sequences, consistency of learning and, above all, predetermined learning achievements. Such a constellation overlooks the operational reality and the problem-solving processes for which vocational training is supposed to systematically prepare the trainee.

The combination of vocational learning and the enterprise demands special didactic systems, demands that the teaching staff be specially prepared for this particular kind of combining training in vocational theory with the school's production processes and economic activities. Relatively brief vocation-specific familiarisation normally suffices if the instructor in question has had sufficient practical experience.

Another way of organising school instruction in school enterprises is to develop courses in relation to the genuine job situation in industrial firms and in medium and small-scale enterprises. This is followed in schools in France[40] and has produced a new idea about the design and organisation of school instruction.

*Practical or active learning in training workshops*

Training workshops and science laboratories are becoming more common in almost every educational endeavour associated with school enterprises, and 'hands-on' is a popular description of in-service training programmes. Even in the development of critical thinking, the importance of active and contextual learning has been recognised.

Practical or active learning makes the operation of the production processes and jobs simpler than when these have to be done by reading books or memorising the works which describe action. The opportunity to watch each process being completed, to hold each of the pieces, and to get the feel of the materials makes job tasks relatively simple. The simplicity of some apparently complex processes is illustrated in the practice of medicine. In describing surgical training, doctors often talk of 'watching one, doing one, and teaching one' during their internships. This shows that there is nothing that can match active participation for learning process-oriented subjects.

*Project method and team work*

Whereas theoretical learning follows primarily the training course method, the practical skills in training workshops follows the method of team work and project work. The learning organisation in the project method is built around learning goals (competencies) whereby the learning contents are adapted to the learning goals. Theory has only a supporting function and is not an end in itself. It enables the trainees to understand their trade better.

For some time now, the project method of training has been increasingly supplanting the training course method in many school enterprises.[41] In the MAN Salzgitter project, four students make up a project team. Their task is to independently design, construct and produce a complex technical system in the field of applied industrial automation. Planning, organisation of production, purchase of components, and cost calculation are important elements of the project work. The project work is examined and evaluated and it has direct relevance to employment in the industry.

This didactic system includes selection of project tasks from the flow of production. This requires flexible combinations such as temporary integration of theoretical and practical learning in the form of workshop groups, and the development of special learning and teaching aids for both the teaching staff and the trainees.

Group activities and team work play an important role in the project method. This helps in avoiding the disadvantages of structuring that is common in traditional course training. Group activities and team work through the project method not only promote the necessary technical skill and knowledge, but also the necessary attitudes, behaviour and orientations. Co-operative forms of production are necessary in promoting mutual help, experience exchange and critical thought.

In comparison to the training course method, the learning sequences in the project method cannot be planned in detail. The prescribed learning objectives

40 Bruyère, A., 1989 pp. 45-46

41 Greinert, W.-D. and Wiemann, G., 1993 p. 66

cannot be as well-controlled and secured as in course-learning situations and in vocational school subject lessons. Teaching staff often perceives such instruction as overly time-consuming and too unstructured, and the fact that different teachers are expected to function in a team may serve as a source of conflict.

In some cases, the project method has been introduced right from the inception of designing school enterprises. This aids in achieving an economic viability situation. Through the project method, trainees are involved in the selection of products and services which can be used locally, taking into account the surrounding market for these products. Product analysis and production planning are incorporated at the beginning of the training. Planning and monitoring of economic activities are therefore taken care of right at the planning stage itself.

The project method encourages team work between students and teachers who, through their combined efforts, first conduct a survey of the region with regard to what trades the community requires, the employment/self-employment potential of the trades, local resources, geographical and climatic factors, and future projections of industrial and infrastructure growth relevant to the region.

The project proposal contains details of organisation, location, type of vocation, market potential and linkage, names of enterprises practising the relevant vocation in or near the location, whether vocational training is already being imparted in the trade in question, outline of the teaching requirements, linkages with other institutions involved in the vocation with the aim of optimising resource convergence, scope and objectives, and the requirements proposed: financial and infrastructure, possible resource alternatives, income expected, and time schedule of project.

*Training according to modular learning units*

Training according to modular learning units has also been employed in some case studies of school enterprises (Costa Rica). This training is based largely on modular learning units similar to the 'Modules of Employable Skills' (MES) developed by the ILO.[42] The MES are based on vocational profiles prevailing in industrialised countries, the overall qualifications for which are respectively segmented into partial qualifications which can be applied separately. It is possible to obtain the overall qualification in one vocational profile by successively acquiring all partial qualifications. Another possibility is to acquire only partial qualifications from several vocational profiles: a kind of cross-vocational qualification which often tends to meet best the qualification needs of the target groups in question. MES qualifications are possible in training courses as well as in private studies. The ILO has elaborate training manuals for students and additional training material for MES instructors.

One advantage of the MES training approach is that it allows the choice of individual learning programmes suited to the specific qualification needs, starting level of technical skills, and time constraints of each participant. On the other hand, as MES are especially designed for self-training purposes, it may be too individualistic an approach for participants from the informal sector, who need guidance on account of their particular learning disadvantages. The use of MES learning materials not only requires 'hard skills' in reading, writing and mathematics, but also the ability to learn systematically and without guidance on the basis of logically structured didactic material. Persons from socially disadvantaged groups may not have these basic educational competencies. Even skilled craftsmen who can read, write and do calculations reasonably well may have difficulties in thinking in abstract terms and understanding technical drawings without any guidance. A further difficulty is that, since MES has been developed on the basis of industrial technologies, the training and learning of MES skills and their application at work requires tools and equipment, often a workshop, which, at best, will be found in modern industrial enterprises, but normally not in micro-enterprises. Another shortcoming of the MES approach is the segmentation of skills. As a result technical inter-dependencies are not easily realised and understood. Because theory is not taught, learning is reduced to practical training.

In the 'Talleres Públicos' (Costa Rica) these shortcomings can be partly offset, in principle, by technically and didactically trained instructors. The general tendency is, however, for people with little previous training and education not to start a training course at all for fear of dropping out.

## 3.4 Competency profile, learning outcomes and learning goals

Skill components of vocations in school enterprises vary in their degrees of general and specialised *applicability*, and in the *depth* of both the general and the specialist components, which might be conceptualised in terms of the time taken in acquiring those skills.

*General competencies* are applicable in several contexts. *Practical skills* are functional skills, not primarily vocational skills in the narrow sense. They serve both to facilitate more specialised learning and adaptation. Generalised skills are either generally applicable or relatively specialised: practical skills

42 See International Labour Office (ILO), 1982

and general competencies at a personal level of awareness are generally applicable; on the other hand, an understanding of the world of work: for example, an understanding of the structure and processes of work, its technologies, its relation to production, or its economic, cultural and political context have a more specific applicability. In practice, one finds a correspondence between generalised skills and vocational skills.

General components of vocational skills have direct relevance to work. Many of these are actually 'process skills' whereby the product is of lesser importance than the way the trainee goes about doing things: for example, the scientific approach to occupational trades, the ability to identify problems and explore solutions or to plan and execute one's work.

Generalised components of technical and vocational skills include:

1. Communication skills: these are of ever rising importance in all countries in today's world;
2. Entrepreneurial competencies: organisation of a small workshop, material acquisition, price calculation, bookkeeping, product marketing;
3. Cognitive skills: technical knowledge, theoretical knowledge, linguistic skills, mathematical skills, natural sciences which are directly applied and required in practice;
4. Social competencies: co-operation and interactive communications at work, the ability to handle structural and behavioural conflicts and the ability to settle conflicts; ability to establish vertical and horizontal contacts within the structure of the enterprise as well as outside the enterprise;
5. Organisational competencies (managerial capabilities) include understanding the management structure and work organisation of the enterprise;
6. Occupational problem solving (job performance): possible only by means of learning to integrate various techniques, social processes, various workplaces, various social relations, various management and administrative functions (job scheduling, job evaluation, insurance, health) and various production and entrepreneurial skills.

'Workplace instruction'[43] is the term used to describe the need in the modern workplace for basic competencies such as oral communication skills, adaptability skills, development skills, collaborative skills and leadership skills. Although the context within which this term has come to be used is modern industry and its role in supporting education in basic competencies, school enterprises have a similar role to play in promoting basic skills (reading, writing and computation), collaborative skills (interpersonal relations, teamwork and negotiation); communications skills (listening and speaking); development skills (building confidence, motivating, setting goals and planning) and, finally, adaptability skills (resourcefulness and creative thinking).

The competency profile, i.e. the mix of generalised and vocational skills, imparted by a school enterprise ultimately depends on the form of learning adopted. Ideally, once the aims of the programme have been clarified, these should be translated into a range of specific skills, knowledge, understanding and attitudes which the programme can help to develop. A critical step in the design of the curriculum would be to identify, on the basis of a broader conceptualisation of employment related skills, the desirable range of skills and knowledge outcomes, then to operationalise these in terms of the learning situations pupils would need to get involved in. For example, the awareness of factual method is better achieved through the vocational course method. On the other hand, the project method is more suited for the use of information to solve new and unanticipated (not in the text) problems. Apprenticeships are a good way to acquire application skills, i.e. to learn to apply factual information.

Skill-level scaling needs to be based on duration and depth of training in both generalised and specialised components of vocational skills. This approach is different from the one that has been followed in diversified prevocational education programmes: first, to decide to have a new subject, then, to specify what to put into it.

In many countries, a great weakness in curriculum development agencies is their lack of ability to come to terms with the non-technical transferable competencies, and insufficient scrutiny of how to promote behaviour or attitudes such as problem-solving, team work or adaptability. The major requirement would be not only more resources but a fundamental change in teaching-learning processes: general capabilities are taught in the context of work processes, rather than the two being seen as belonging to separate locations and levels of the vocational training and education system. The priority here is not to introduce a separate subject, such as 'enterprise education' giving an academic treatment of enterprise and business topics, but rather to define non-technical competencies – inculcation of initiative, risk-taking, self-reliance, perserverence, identifying and solving problems – in relation to actual schemes of production for the market in the schools. Skills like designing and problem-solving can only be adequately developed if pupils have opportunities to be directly involved in such activities. Given the constraints of schools, this provides a special chal-

43 Carneval, A. P. et. al., 1990

lenge to curriculum planners and teachers. Its neglect would greatly affect the credibility of programmes combining education with production.[44]

Offering vocational training in school enterprises is far more than buying tools and machines and hiring some instructors. It requires the creation of an environment which nurtures the learning process.[45] It also entails transmitting the values contained in occupations. Vocational education is not tools or market production, just as academic education is not books. Cleaning the shop and oiling the machines should be part of the ritual of good workshops. This liturgy of cleaning is a means to transmit the values of the occupation. Trainees in school enterprises may begin by producing something rough and poorly finished, but they are expected to be perfect. Those who fail to understand this point cannot understand why ordinary teachers will never become good teachers. Most of the problems and dysfunctions of vocational and technical education result from not creating this non-material environment. Case studies point to the attempt made in school enterprises to create an ethos of cleanliness and perfection which is proper to the particular trade and technical skill. School enterprises have the important goal to teach students the value of social goals in addition to imparting production skills.

On the whole, evidence shows that school enterprises constitute a meaningful setting for the development of basic skills and knowledge, particularly with regard to the planning and executing of small economic activities and the understanding of technologies and production processes. Such outcomes have been possible in institutions with good leadership.

In recent years, much international attention has been given to the contribution of 'key qualifications' or generalised capabilities in vocational preparation. It has been argued that in a rapidly changing environment, schools should promote the development of generalised capabilities that are in built into vocational skills. It is not the development of technical skills alone but the development of generalised capabilities that are a basis for future productivity, adaptability and equity. It is here that the emphasis on quality and the attention to relevance can be merged as there is no inherent conflict between generalised capabilities and vocational skills.

The greater interest in promoting pupil creativity, problem identification, trying out different solutions, manipulative skills, familiarity with different materials and technologies, insight into the practical applications of scientific concepts and principles have led to a reduction in the distance between vocational and general competencies.

## 3.5 Curricular processes

Any discussion on job-related vocationalised competencies and education linked to market and employment will need to take account of questions relating to the extent school enterprises are in a position to adopt a market perspective without neglecting the pedagogical aspects. This raises not just logistical questions about resource availability, but also more fundamental ones of the inclusion of production processes in the curricula, the appropriateness of the curriculum for learning the flow of production and the processes of production, the teachers' familiarity with the job-related curriculum, the adequacy of curriculum materials as well as the assessment procedures.

### Integrating productive activities into school curriculum

The first question school enterprises need to address themselves to is: how is the production process as its central element to be integrated into the school curriculum? In school enterprises, production (the technical equipment and work organisation) operates under conditions very close to those prevailing in actual enterprises. Nearness to technical and organisational reality and the applicability of skills is an important principle of school enterprises. The work organisation can take the form of a craftsman's workshop, a construction site, a production assembly line, a bakery or a farm. The technical and social organisation of work can be disclosed to the trainee via abstract theory and reflection. In many schools, however, school enterprises overstress the technical aspects of production. In doing so, they too frequently neglect the work-organisation aspect. Such school enterprises put a higher emphasis on the economic goals while neglecting their educational goals.

Integrating the production process into the curriculum entails translating the complexity and variety of industrial reality such as operational functions, the interrelationships, e.g., mechanical systems, work organisation, jobs, etc., into a range of skills in order to make the complex reality more comprehensible for the learner. Learning is supported by introducing systematic teaching aids (textbooks and tables, laboratory devices, and audio visual aids, etc.), the express purpose being that learning goals are achieved, learning time is utilised optimally and, in particular, trainees are made to understand technological, scientific and mathematical laws involved in the jobs they perform. In this way, the whole production process is made to meet the requirements of the student-training programme.

44 Hoppers, W. and Komba, D., 1996
45 Castro, C. de Moura, 1988

**Training stages**

Once the technical and work organisational aspects of the production process are translated into a range of skills, it is possible to scale skills according to basic, intermediate and advanced skills. The first year of training may include courses in basic skills and, later, intermediate and advanced skills. Basic skills training often includes basic training through the training course principle. But basic training may also include fabrication of simple parts for product components or elementary project work. Intermediate specialisation normally includes machine familiarisation, training course sequences and production-oriented training. Advanced specialisation usually includes production training.

The goal of training through school enterprises should be the efficient manufacturing of good quality goods. This would bring down labour costs. Furthermore, the goal should be to qualify workers for a variety of skills that can be employed at any time and place. Skill training should comprise of competencies needed in a broad range of occupational tasks. And, finally, training should train for social reliability, corporate standards and social interests.

The structure and size of school enterprises determines the extent and depth of the skills imparted to the trainees. In some schools, such as PIKA in Indonesia and Don Bosco Technical Institute in India, there are more options to structure the sequence of production activities and allow different approaches to complement one another. As a result, it is possible to have different stages of vocational education ranging from the basic vocational stage, the specialised vocational stage and apprenticeship to full-time operators and entrepreneurs. This contrasts with the business centres in public technical institutes in Ghana and Kenya, as well as the example of the Industrial Training Institute in Bangalore, where the delegation of responsibility for more explicit application of vocational specialisations to non-formal provisions and informal sector apprenticeships makes more sense as governments have to choose between investing in vocational education for the few and an improved quality of vocational education for the many.

**Changes in curricular approaches and learning outcomes**

Several shifts occur overtime in curricular approaches. Programmes may start with very strong components of vocational training. But their succession may also reflect the shifts that have occurred: from focus on technical skills towards more emphasis on specialised training in real work processes, which can still make a contribution to pedagogical outcomes. Some of vocational secondary schools in India that have established school enterprises are thinking seriously on the lines of promoting general competencies, such as principles of work ethos, in addition to producing for the market. There may also be shifts from production-cum-training towards a separation of these two functions.

**Decentralisation and local choice**

The process of curriculum development is an area of support infrastructure and is of vital importance. The process is fraught with difficulties as curriculum organisations like to adhere to established procedures for the development of curriculum and learning materials. Where such procedures are very centralised, conflicts easily arise between national prescriptions and the schools' implementing capacity. There is the necessity to allow much scope for local variations and 'enrichment'. The challenge to curriculum organisations is to provide as much guidance as possible to teachers through handbooks, pupil texts, guidelines, models of syllabi, while leaving much scope for local choice and adjustment.

Decentralisation of the curriculum may however have the unintended consequence of creating gender differences. Curriculum decentralisation must therefore be supervised by curriculum organisations. In the case of Papua New Guinea, curriculum decentralisation has in fact caused gender-related differences. For example, there are significant differences in the skills that women have access to. While both men and women are trained in agriculture and livestock production, women are more likely to be involved in subsistence production. Men tend to work in large scale non-subsistence agro-industry-oriented production lines. Men perform the machine-dependent operations, whereas women are confined to hand work. Women are more likely to receive classroom teaching of business skills, rather than practical experience in business skills.

Existing pedagogical services may require the development of effective linkages with industrial organisations. The guidance and active contribution by the latter organisations is of central importance to ensure the relevance and effectiveness of technology education and productive projects.

In the case of the Don Bosco Technical Institutes, the fact that normally all graduates from the school enterprise find employment is mainly due to the orientation of the training content to the competency requirements of potential employers. The Salesian approach of establishing and maintaining an extensive as possible network of contacts to government and private employers is not only to ensure the right and up-to-date identification of the competency requirements for

skilled workers, but also to facilitate the job placement of graduates.

**Course structure and duration**

School enterprises offer vocational training in an array of courses. Courses are modified over the years and evolve in response to market demand. Some courses need to be retained because they provide good basic training.

The optimal duration of the course is one within the period of which those competencies may be taught, which will enable the trainee to get employment and, at the same time, make his vacancy available to new-comers. In Brazil, it has been possible in some school enterprises to extend the duration of the courses because the students are not forced to earn outside the school enterprise.[46] It has also been possible to discard the rigid course structure and its mandatory sequencing of tasks, and give due consideration to the weaker students. The students can continue to work in the school enterprise, work to earn an income even after acquiring all the necessary competencies, till they have found a suitable job. During this period, the students pass on their skills and knowledge to the new students.

As regards the course materials, instead of a task-oriented systematisation of materials which start with simple tasks and proceed on to more difficult tasks, it is desirable, especially from the point of view of later employment practice, to have a handbook in which the individual tasks may be looked up as and when a problem arises. It makes sense to develop a collection of loose sheets dealing individually with the relevant tasks taught during the course. This could then be bound up as a manual to be used later. Training aids may be produced in the school enterprise itself.

Courses, such as weekend courses, must be adapted to the work routine of the participants. The reduction in the leisure time of such workers could be compensated through work in small production groups with a good ambience. This is particularly important in the case of women, though men are also seldom free of social obligations and other demands to their time.

The courses should be clearly formulated, compact, and of not too long a duration. Courses should be divided into basic, intermediate and advanced courses. Upon completion of the first module, the learner should find it easier to follow the next module. Each module should be self-sufficient and allow the student to break his training only to return to join the next level after acquiring some experience in his community or in local enterprises. The certificate should contain a list of skills and knowledge which the student has acquired during the course.

The courses should be oriented towards the demands of the immediate community for services and products, and also prepare students for employment in their own communities. This demand orientation should also include the possibility of developing new products and expanding existing markets. With regard to the promotion of self-employment, production courses must be oriented to economic activities in the informal sector.

Great value must be put on practice-oriented transmission of basic skills and knowledge in the context of activities (welding) within an occupational sector (metalworking). This general experience with basic skills is important as a foundation for later work as a specialist as well as for self-employment. The broad exposure to basic skills is important for the students to choose a trade suitable to their aptitude and talent as well as for preventing frustration and frequent job changes.

The courses should be so designed as to promote as much co-operation as possible between the students. The aim of this co-operation should be the administration of the courses by the students themselves, i.e. production planning, cash and sales control, calculation, making payments, etc. The students should co-operate and feel a responsibility for all aspects of their work. This would mean a conscious distancing from a capitalistic and hierarchical learning organisation. It would be desirable, indeed, if the students could also extend their co-operative effort to the period after their vocational training.

It is necessary to introduce problem-oriented course materials. Course units should be built around the finding of a solution to a problem rather than only demonstration, observation and imitation. The students should be taught to question why a particular solution is the right one and another the wrong one. Over and beyond this problem-orientation, it is necessary for the students to develop problem-solving strategies which would allow the students to later deal with problems independently. This would place emphasis on the creative potential/creative capacity of youngsters in solving problems that reside in their own environments which permit and even encourage the exercise of that capacity.

Emphasis should be given to creativity, experimentation, and learning to work without errors. An attitude of independent problem-solving can be promoted through a broader general education as is

46 Fachgruppe Technik/Handwerk des Deutschen Entwicklungsdienstes in Brasilien-Mitte (DED) 1987, pp. 343-356

already existent among the students. They should be motivated to attend non-formal educational courses to improve their general education till at least the 8th level. Theory should be introduced in the production course only when the practice so demands.

Parents could be included in the planning of courses as well as in the monthly evaluations and planning get-togethers.

**Curriculum development**

There is a great need for developing curricula with a high degree of flexibility and integration into existing work situations. Curricula should avoid an over-burdening with instructional materials. It should be based on the principle of using examples around genuine and concrete tasks. Rather than introducing uniform, standardised and detailed materials which are to be passively used, the curriculum must ensure active participation of all workers in genuine learning tasks. Curricula should be problem-oriented.

A curriculum need not always be in written form. It could be designed on the basis of products around which basic technical skills can be learned. This method has the advantage of saving on programme costs, as products can be sold or used for own consumption. Furthermore, products can be more easily adapted to local market demand than written materials, and are less amenable to standardisation. Instead of introducing industry-oriented theoretical courses built around productions manufactured in the modern formal sector, it makes more sense designing courses around the repair of products. Again, repair of products does not lend itself easily to a standardised curriculum.

A major problem is the production of identical products within a restricted geographical space of a local settlement. Training contents should, therefore, not be the same for all, but should reflect opportunities for diversifying into new lines of production and products. This may help the graduates from school enterprises to overcome the extreme competition while setting up their own enterprises.

The restricted financial situation of youngsters means that they may, later on, have to creatively adapt to available technology. A real challenge of curriculum development is, therefore, the development of courses built around improvised techniques. This could be done on the a basis of an examination of the scope for the development of appropriate technology within school enterprises. Courses need to be developed around competencies and technologies that are perceived locally as important and accepted ways of survival and development, rather than by adopting a top-down approach of diffusing modern technology and qualification requirements from formal private sector institutions into school enterprises.

Curricula development should consider the trainees' general maturity, their degree of exposure to the world of work, and to situations of sheer social and/or economic survival. What should be the relation between competencies and attitudes to be promoted by education and those actually developed in the home environment? How old should youngsters be before they are exposed to hand tools or electrical machines? At what age are young people ready to think about vocational choices? How does this vary across different socio-economic or cultural environments? Schools should be able to complement what is learned in the home. On the other hand, schools also have the task of widening horizons opening up new avenues and perspectives that reach beyond the home environment. Thus schools may deliberately wish to counterbalance the production orientation trainees are exposed to at home by means of embedding their work orientation in curricular designs.

Curriculum development requires much professional input from outside the organisations. There are several difficulties in organising the curriculum on the basis of production. In most of the experiments, the curriculum is not worked out entirely on the basis of production. Selection of vocational learning contents entails applicability, completeness, controllability. It requires a carefully planned and systematic approach to learning. It requires regularity and constant supervision by selected experienced instructors. The approach is expensive, and it calls for considerable investment in staff, space, technical infrastructure and a separate location.

**Principles underlying curriculum integration**

Educational programmes are designed according to curricular principles established in the field of human psychology. Among them are the defining and sequencing of skills and principles, the interaction between theoretical practice and practice through manual or observational means, and the targeting of educational experience differently in different age, ability and interest groups. Vocational education is both practical and academic rather than binary opposites as many tend to cast it.

In school enterprises, one is dealing with vertical investments in specific curricula and specific abilities. In terms of specific curricula, plumbing is not the same as carpentry, and poultry differs from agriculture. Investments in curricula are made differently. For those faced with making investment and managerial decisions, it is necessary for them to match labour

market demand (demand by horticulture, etc.) with the questions of the learner's ability, the learner's interest and institutional and management environment (co-operative work environment).

Once vertical investment in specific curricula and specific abilities are made then the question arises regarding its horizontal integration: how to link the practical work in plumbing in a training workshop with the theory in science through the course method? Projects offer a potential for horizontal integration of learning and production. An effective linkage between learning and production is only possible if either the same teacher or a team make a direct and explicit connection between different dimensions of the same trade (for example, plumbing) whereby the scientific, social and technical dimensions can be jointly explored. This kind of integration has a great fascination for planners. In OECD countries, there are attempts to relate science to technology and to emphasise the design side of craft and technology and, elsewhere, interest in bringing science into agriculture and crafts. Although this approach does not remove the problem of curriculum fragmentation, it could bring theory and practice much closer together and thereby increase the quality of learning in key areas of basic knowledge and skills in school enterprises.[47]

A related issue concerns the method of learning: to what extent will learning be more experiential and based on actual productive activities? Production for the market should involve a direct and conscious confrontation with forms of work and production in one's own environment. As already indicated, the notion of combining education and production through school enterprises basically involves pupils in an actual experience of production. School enterprises have a broader aim than the limited work-orientation projects. They are more vocationally specialised imparting job-specific skills, and more extensive than the work-orientation programmes, and emphasise learning outcomes as well as economic output.

**Balancing learning and production for the market**

Important for reaching a balance between market and learning experience is adjusting training structures to market orders, i.e., arriving at an optimal synchronisation of different forms of training in view of the variable market situation. This is probably one of the most difficult problems of school enterprises. Regarding synchronising economic activities and training programmes, some school enterprises accept orders according to purely commercial criteria. Experienced instructors and technicians then sort the incoming orders according to their respective degrees of 'training suitability'. Any order that does not fit into the training programme, perhaps because of short deadlines, technical problems or excessive volume, are passed on to the school enterprises' normal production staff and senior trainees. Conversely, detailed production quotas are often compiled to satisfy the training plans, and then presented to the regional enterprises with a cost estimate as a special offer.

In schools with a relatively fixed array of products, instructors and technicians schedule work tasks to coordinate training and market production. Division coordinators and instructors translate the detailed production plans into training content.

## 3.6 Teaching staff

Teaching staff in school enterprises include a wide variety of personnel. Master craftsmen are normally responsible for production as well as training and economic activities such as acquiring orders, keeping the production process going, and supervising the production trainees. Instructors are responsible for training. They supervise and help trainees acquire certain skills, knowledge and attitudes. Theory instructors hold theory classes. Experts from industry, such as qualified engineers, are expected to offer expert advice on demand.

In the context of school enterprises, teaching staff are expected to participate in more than one function. They are responsible not only for the production process but also for market production, and they are, at the same time, responsible for making possible a meaningful vocational education in theory and practice. In view of these multiple roles, effective functioning of school enterprises necessitates a division of labour of teaching staff with different skills and different backgrounds. Teachers must be recruited in terms of their technical, economic and didactic backgrounds, as well as in regard to their level and duration of practical experience. Special attention must be given to the recruitment of staff for the acquisition of orders and marketing. The monitoring of production may be carried out by experienced production workers or master craftsmen who should have experience in scheduling work and specifying practices through work manuals and so-called 'project handbooks'. Didactic planning, instruction, and the control of learning progress in school enterprises should be the responsibility of full-time instructors who have been specifically prepared for this task. This division of labour is necessary in order to avoid a conflicting situation where teachers are caught between the learning requirement made by the school and the enterprise's technical and economic interests.

47 King, K., 1985

But there are several problems faced by teachers in school enterprises. On the one hand, teaching staff may find that their productivity is low because of their out-of-date knowledge and experience. They may not be able to perform at a high enough standard. The training of technical and vocational teachers may not have included a true exposure to the world of job-related competencies. It may have been too academic, or too theoretical, to allow them to function effectively in production activities. On the other hand, the production activities may be inadequate for providing a sufficiently comprehensive and up-to-date experience for teachers.

There may be a low motivation to work in school enterprises on account of the lack of career mobility resulting from lack of industrial experience. Non-availability of appropriate incentives for staff and students involved in the process may result in disinterest and negative attitudes amongst them. The resistance to women and minority groups may deter school enterprises to employ such people as teachers.

Sometimes the conditions or work in production activities are more demanding than in purely training activities. Thus, the technical and vocational teachers may be reluctant to take on additional responsibilities of working in production activities. Therefore back up support to staff from the management of the school should be given special attention.

The trainers may be engaged in school enterprises in addition to their full-time duties in technical training institutes. This leaves them very little time to devote to the preparation of course material. They have usually had their training a long time ago and usually have no pedagogical experiences apart from demonstration and imitation.

**Recruitment of teachers**

The form and qualifications of the teachers in school enterprises is quite varied. Teachers have either had their training in state vocational teacher training institutes or through non-formal provisions provided by the state or non-governmental organisations. In a few cases, trainers and instructors are deliberately recruited from industry or from among experienced producers. They are given salaries that are similar to levels prevalent in industry. This prevents mobility into industry. However, not all school enterprises are able to afford high salaries for the teaching staff.

Although most school enterprises lay value on the possibility of recruiting the requisite training staff from among their own graduates, there is a high turnover among teaching staff, especially when teachers set up their own enterprises.

On the whole, licensed teachers with an official mentality may be inherently less suitable as instructors than are master craftsmen, technicians and engineers. The latter instructors can play an important role in imparting existing skills needed by local enterprises as well as in transmitting new emerging skills and, therefore, creating new markets.

**Responsibilities of teaching staff and school heads**

At the institutional level, a major consideration in the successful running of school enterprises, combining education with production for the market, is the role and responsibilities of the head teachers and the staff.

Those who get involved in school enterprise programmes find themselves turning into part-time farmers, wood or metalworkers, builders, supervisors of working parties, office managers, procurement officers, and financial administrators. Very often, no prior training for these roles has been received or the original training proves to be insufficient. School enterprises may also involve extra duties during out-of-school hours with regard to preparation, repair or maintenance, extra-curricular activities, industrial visits or community service. This is not counting the large amounts of time and energy being spent on professional development activities away from school.

The options for organising staff vary greatly. The start-up and experimenting with new learning activities is heavily dependent on the special commitment of teachers who choose to work with the initiating agencies. Where teachers are given special responsibilities, these should be officially acknowledged, supported with training, and rewarded with incentives.

The division of responsibilities in the context of school enterprises applies to the vertical division of tasks between ministries, national organisations and lower levels of authority, and school enterprises. It also applies to the division between school heads, staff and trainees, and between schools, communities (parents and workers) and industrial organisations (managers, employers, employees). Generally, it seems that more decentralised and participatory decision making and more sharing of tasks between the parties concerned promotes greater interest, motivation and commitment.

An essential condition for the above to take place is an improved information system as a basis for more effective planning. More options for school activities and a greater diversity of requirements in terms of staffing, materials, tools, etc. make greater demands on efficient administrative interaction within the education system and with the external environment.

Matching teachers with special facilities and materials and with local needs is a complex exercise. Information flow in a decentralised context may help in adapting the changing scope and complexity of school enterprises with competency development and with availability of local and national resources.

Managerial continuity through long-term commitment of individuals may be important for the success of school enterprises.

**Basic services and associations**

Although instructors may be qualified to teach, come from social backgrounds similar to the students, have a good relationship with the students, and transmit the competencies efficiently, many of them nevertheless lack a pedagogical background. Further education to promote the didactic competencies of instructors should include the following elements: before the beginning of the course, teachers/instructors/trainers should be engaged in course planning, setting up a workshop, selection of adequate course materials, working out didactic materials, and selection of adequate training methods. During the course, they should be taught how to prepare a lesson plan and how to evaluate student performance. After the course, teachers/trainers/instructors should be able to evaluate the learning output (competencies acquired), evaluate the course, evaluate the course success (employment placement, prevention of migration into cities, more relevant, more cost-effective, etc.).

An essential element of teacher upgrading can be the enhancement of networking among instructors, master craftsmen, experts from industry, managers and educationalists involved in school enterprises by arranging for regular professional interaction and co-operation between teaching staff and administrators at school level, on the one hand, and, on the other hand, industrial experts, supervisors, inspectors, educational advisors and teacher educators at regional and district levels. This interaction can provide minimal guidance and moral encouragement to teacher staff, and lead to joint activities in areas like curricular adaptation, organisational improvement of activities, and designing supplementary learning materials.

The MES and similar modular vocational training concepts are most suited in the advanced training of instructors who need to acquire additional partial qualifications to improve their technical know-how. In conjunction with some pedagogical training, the MES could be used to qualify technical trainers and advisers in small and micro-enterprises (especially in rural areas) with a trade specific and also self-employment focus. Such training of trainers could be held in existing school enterprises.

Continuous upgrading of the teaching staff via refresher courses is necessary to ensure that the school enterprise keeps abreast of technical progress.

Teachers can play an important role in curriculum development in the quality of in-service and pre-service training of instructors. There should be an adequate curriculum for instructor training. Facilities for how a school enterprise should be equipped or operated should be made available. Didactics should be taught. Instruction in teaching methods should be conducted by staff who have experience in teaching adolescents in workshops. Training should include how to conduct a survey of existing skill requirements in the local area. Managers of the training of instructors should themselves have adequate exposure to in-service training.

The implementation of school enterprises demands interaction between professional agencies and the schools. Curriculum centres and the inspectorate need to work directly with the teachers. Where teachers' centres or resource centres exist, they must be adequately equipped. A lot depends on the voluntary commitment of already overburdened teachers. Relations with other government departments, or with industrial establishments, must be strengthened.

There is also a need for a reorientation of professional style: moving away from a top-down, prescriptive approach to a more collaborative and supportive one. The instructor should be treated as more than an advisor who should be there to reply to questions put by the students. This independent problem-solving attitude and further education can be promoted through the facilities of a library, in-service training, distance programmes and self-contained manuals.

## 3.7 Regulatory framework of school enterprises

School enterprises must have a certain freedom to move on the market. This autonomy should also extend to the training concept, the selection of students, the use of earnings, the remuneration and upgrading of training personnel and production workers, choice of financing methods, the examination and certification procedures, and various other regulation and incentive structures.

Public educational institutions may lack an effective relationship between the school and the market. This may hamper the effective functioning of school enterprises. By contrast, integration with the market may be easier and more real in the case of programmes conducted by non-state organisations and local community bodies.

**Assessment**

There is the problem of how productive work should be assessed, particularly how to capture the more complex learning outcomes such as the cognitive skills, problem-solving skills and the practical competencies. There is also the problem of the extent to which programmes such as project work, productive work, or prevocational studies should be nationally examined and play a role in selection to a higher level.

The inclusion of market production in the national examinations may be an effective way to make pupils and parents take productive tasks seriously and to increase their status as acceptable areas of learning. There is a glaring difference between school enterprises where, even when productive work is examined and assessed, they rarely feature in the entry requirements for higher-level education or training. This even occurs where the selection is for technical training colleges. These tend to be more interested in the performance in academic subjects than in the previous productive experience. In the context of school enterprises' new criteria for assessment, such as project work, team work and creativity need to given more emphasis. Many questions remain however. Who should grade the examinations and provide school-level observations? The answer could include teacher associations, parent committees, and representatives of the ministry and the academic community.

**Selection of students**

Several background factors, such as age, work-experience, business exposure, social background, wish and potential of candidates, men/women and rural/urban ratios play a role in the selection of trainees in school enterprises. Rigorous selection or enrolment policies, where achievement and economic potential aspects of the candidate play an important role, need to be weighed against social background of trainees and equity aspects.

Selection criteria need, however, to be consistent with the development objectives of the vocational institute.[48] If self-employment is the focus of school enterprises, then trainees should be selected who have an aptitude for self-employment. This has been demonstrated in the case of the Don Bosco Self-Employment Research Institute, Calcutta, which selects students on the basis of their social and economic disadvantage as well as their entrepreneurial skills. Instructors and trainers carry out the important task of identifying and selecting those trainees for training in self-employment who show entrepreneurial abilities. Equity considerations are applied right from the stage of enrolment of trainees to the institute, because an important objective of this institute is to promote self-employment among the socially and economically disadvantaged youth. This combination of self-employment potential and social disadvantage as a selection criteria is especially important in the state of West Bengal, which is known to lack an 'enterprise culture': a culture which motivates students to take risks or enrol for technical subjects.

Equity considerations play an especially important role among the school enterprises which are run by church organisations, rather than private industry. The good chances for graduates of the Don Bosco Technical Institutes to find jobs in the modern sector induces middle-class families to obtain a training place for their children, even in schools set up for poor children. Nevertheless, many of the Don Bosco Institutes recruit children exclusively from very poor families.

Most school enterprises in the survey place emphasis on basic general education competencies in the selection of trainees who mostly have at least eight years of education. Where this level of general education is lacking, trainees are required to undergo an extra year of training in the school enterprises. However, the fact that the majority of young people nowadays have a secondary education should not be overestimated as, very often, they are unable to solve even basic problems, such as unit conversion or the interpretation of simple technical drawings, because of the lack of basic knowledge in mathematics or physics.

**Monitoring and evaluation**

Monitoring and evaluation at the institutional level should have a pedagogical benefit, i.e. it should be an aid to the learning system. The appraisal of production should be taken up by the students by first theoretically planning the production norms, materials, cost and quality, marketing and innovations suggested. In terms of quality enhancement, improvements should be made in production technology, as well as reduction in process time, by both trainees and trainers.

Effective monitoring requires a careful identification of relevant information categories, of indicators for change, of suitable methods for efficient data collection, of formats of change, of analysis and presentation which enable results to be used by different audiences be they be planners, researchers or the wider public. A variety of school activities may have to be systematically recorded. The roles of more parties need to be tracked. Wider diversity of skills, and cognitive and affective outcomes, need to be assessed than is the case in more conventional curriculum areas. Tracer information needs to be collected on how the output of the school system fits into the world of work (earnings of graduates by educational level, incidence

48 See Grierson, J. P. and McKenzie, I. (eds.), 1996

of unemployment, time for recent graduates to land a job). The availability of learning materials needs to be documented. And finally, the cost per student by level and curriculum type also needs to be evaluated and monitored.

Inspection should be professional. Inspectors should have an objective criteria against which they evaluate school enterprises and training. They should possess a list of activities against which they can assess the mastery of skills. Likewise, the local relevance of the syllabus should be considered a part of their repertoire of inspection. Government officers should receive training in monitoring and evaluating school enterprises where such programmes form part of the official vocational training programmes. Resources should be used in such a way that local needs are given high priority.

## 3.8 External relations

With regard to the external environment, issues meriting attention are the sharing of responsibility for production among schools, communities, non-governmental organisations and industry.

**The economic side of production**

Combining learning and production alone is not enough. Selected production tasks need to be designed for the production of products which may be later marketed. School enterprises must function in the market place and be quick to adapt to the demands of new technologies and processes; they must also be quick to translate these new technologies and processes into the training content.

Co-operation with neighbouring enterprises of the formal and informal sector is necessary, with particular regard to acquiring orders, procurement of materials, the modernisation of technical equipment, the recruitment of teaching staff as well as finding jobs for their graduates and follow-up support for trainees who later set up their own enterprises.

It is necessary to make products which have a demand in the market. For this, it is very important for school enterprises to choose the right product. The market orientation of school enterprises depends on whether their function is that of concentrating on products that are in demand on the regional market, or concentrate on the kind of products that the local enterprises also make, but which the school enterprises themselves could turn out in better quality via more sophisticated technological processes and more modern methods. In the latter case, school enterprises have the important function of creating new markets although this usually involves relatively high financial risks for the schools. Whereas some schools specialise in one particular production field, others comprise of a wide variety of production fields.

School enterprises offer not only products but also services such as information services, advice, further training courses for regional industry and the informal sector, technology transfer, and enterprise development through institutional and enterprise networking. School enterprises are suitable places for providing opportunities for continuing technical and vocational education. In this connection, the school enterprise provides assistance to adults in the world of work. The modern equipment of the school, the level of training of its teaching staff, the technical and information resources (technical library, collection of standards, learning media) allow the school to provide competent counselling to enterprises in terms of management (establishment of new enterprises, accounting, bookkeeping, etc.) and in technical terms (introduction to new technologies).

Establishing relations with existing industrial organisations has other important reasons. What students can possibly gain in school enterprises is usually limited in variety and scope. In the present age of rapidly developing technology and swiftly changing society, one cannot imagine it would be enough just to teach students certain skills for only one particular employment position. One has to take into consideration the need for the development of young people to face the challenge of the future. In this connection, it would be necessary to establish relations with existing industrial organisations.

While school enterprises provide skills for traditional and new jobs, there needs to be close co-operation with enterprises to enhance the quality and efficiency of product development, production and maintenance. Large enterprises can provide technology and expertise to trainees in school enterprises in both traditional and newly emerging skills. Even the small enterprises in rural and urban informal sectors can provide experts to provide the training needed for existing jobs and production practices.

Given the importance of sustained technical and professional support, and of local co-operation for the successful implementation of school enterprises, the relations with existing industrial organisations and small enterprises need to be given more than marginal attention.

An indispensable prerequisite for enterprises to play a major role in vocational education is the attitude on the part of entrepreneurs and trade unions in supporting school enterprises (for example, in Germany).

**Integration of school enterprises into the economy of the community**

In most case studies, the enterprises generally reflect the local economies of light manufacturing, rural agricultural enterprises or heavy industries. Service industries such as tourism and hotels are less represented. To optimise production and learning, school enterprises should be optimally integrated into industrialisation strategies and enterprise development programmes devoted to the furtherance of small and medium-sized independent businesses.

Identification and prioritisation of the community are significant elements of the school enterprises. While some needs may be obvious, others are to be determined with a view to diversifying the economy of the community. In this context, the important contextual references would be the investment policies, government programmes, particularly poverty alleviation, integrated rural development programmes, the maximising the use of local resources, and increase in the application of new emerging technologies, both innovative and 'appropriate', in homes and work places. The modality of school enterprises should aim to satisfy the needs of the community, particularly those situated in the area of the school enterprise.

Case studies from China show that farms run by technical and vocational schools are especially useful in meeting the needs of peasants. Such farms are not only for students to gain practice, but also for peasants to learn. Usually, during the period of studying at the school and practising on the farm, the students may also manage their own small farms at home. The beneficial result brought about by the advanced farming techniques spreading from such schools are immeasurable and far exceed the value of the actual goods produced by the school-run farm. This is an effective way to help peasants master practical techniques so as to improve production. This approach of combining education with production through the notion of school enterprises contrasts with earlier productive work programmes in primary schools, introduced as a part of the drive at the ruralisation of curriculum, in which the conception of 'limited productive work' had been integrated in the curriculum as part of the practical subjects or as extra-curricular activities. The school enterprise notion offers not only practical skills or work orientation, but also vocational qualifications, technological and management services, product development, technology transfer, and support to marginal groups. Thus, school enterprises do not only concentrate on production and manpower training, but promote variegated relations to the outside world.

School enterprises function best in regions with a developing industry which offer them the best chances of survival owing to a diversity of production orders (adequate demand) and sufficient employment opportunities for the graduates of their practice-oriented training. School enterprises however may also have to be established as a response to crisis or unrest in the local or regional industry, thus helping in rejuvenating the industry or promoting forms of self-employment to make up for the loss of jobs in the formal sector, or in promoting various forms of life and work in the subsistence sector. The creation of self-employment opportunities as a response to a situation of industrial crisis has been important for retaining the credibility of the principle of combining learning with production. However, apart from the limitations set on the development of small enterprises and self-employment by the prevailing general economic frame conditions and development potential, self-employment and business creation are – for financial, personality related and/or social reasons – not necessarily an alternative option for all those unable to find wage-employment. Nevertheless, the importance and the chances of promoting self-employment and stabilising various forms of life and work in the subsistence sector should be recognised in the field of technical and vocational training as the subsistence economy is the backbone of survival for the majority of people in the urban and rural informal sector.

An important function of school enterprises has been promoting vocational training for existing micro-enterprises in the informal sector. These take into account the principle of satisfying basic needs through the development of appropriate technology, regional and community development, self-help, self-employment and self-management. The interlinking of education and production is flexible and variable according to the basic needs approach (for example, the Vocational Training Centres, Papua New Guinea and the Public Workshops of the INA, Costa Rica). Support usually includes retraining, marketing advice, intervention with suppliers and officials, fact-finding, and liaison with the local market.

The design and management of programmes of combining education with production needs to take into account the various interest groups: parents, instructors and students. As a result of the increasing crisis in the modern economy, parents have begun to acknowledge the additional value of earning while working and of job-specific vocational competencies. They are now often regarded by parents as a useful supplement providing capital in the labour market or preparing the way for viable self-employment. There is a perceived advantage in the labour market. People are motivated only when future benefits are visible to

them. This is crucial for self-confidence and social skills. Students and educators express positive views regarding developments in the area of school enterprise. They are generally supportive, and even praise the role of school enterprises. Educators recognise these developments as positive, especially because of the many financial rewards that would not otherwise be available to the schools and to teachers. This is an important development if practical or vocational specialisation is not to remain of marginal importance, and if its social image and economic attraction is to improve.

In vocational education, any approach to commercial production needs to be based on a direct and organised interaction with the local community. This is imperative for logistical reasons as the planning and implementation usually requires the community's contribution in terms of human resources, funding, information and, often, management of resources. There are also pedagogical considerations as both the relevance and effectiveness of production for the market are strongly linked to the community's interests, attitudes and follow-up actions.

## 3.9 Impact of school enterprises

With regard to the *external impact* of school enterprises the relevant questions are:

- does the incorporation of market production in schools make a difference to employment, self-employment, economic development, the socio-economic survival of young people, the life chances of girls?
- with regard to the *internal impact*, does it develop relevant skills? Does it improve learning achievement and work performance?

School enterprises can – as regards both the objectives of intended measures and the interests of the recipients/beneficiaries – provide competencies to improve income-earning and self/wage employment opportunities in the labour market of the modern and/or informal sector. They also provide competencies for home production to compensate the lack of cash income, reduce the burden of subsistence work, and improve living and working conditions.

As regards the external impact, school enterprises are all the more effective, the more varied the relations they have with the external world in terms of product development, production, maintenance, and marketing. School enterprises are able to achieve a higher stage of development when they offer a broader range of products and services to both formal and informal sectors of the economy. A concentration on production and manpower training characterises a relatively low-stage development.

Participation in community affairs and local economic development are also important indicators of external impact. School enterprises are effective in developing entrepreneurial skills for determining the requirements of the neighbourhood and in developing for it suitable services and goods. School enterprises provide educational experience relevant to business and industry in the area. School enterprises forge community links through need-based courses and services in water, health and housing, and inculcate the spirit of social accountability in technical and vocational institutions.

The other relevant question relates to the internal impact of school enterprises. Internal impact has to do with the efficient organisation of learning experience. This means that the education and training provided is of quality, that the skills provided can be used immediately for enhancing production and productivity with the optimisation of existing resources. Do funds devoted to education have an economic payoff in terms of productivity? School enterprises have been able to generate resources for their institutes, so that more upgraded education and training is made available and, at the same time, dependence upon external funding is minimised.

Of course, productivity does not refer only to monetary rewards: it also means innovative performance, excellence/quality in economic life. It could also mean 'home production' or school production in the form of a more educated trainee contributing to better infrastructure in the school and better housing conditions in their own homes. Thus even though the economic contribution of school enterprises may remain modest, especially in the initial stages of their introduction, yet, at the level of subsistence, sustained involvement of pupils in commercial production for a long time can be crucial to the improvement of their working and living conditions. This involvement helps to prepare students for a cost-saving, less hard and more effective subsistence work for improving their home and working conditions through their own efforts.

With respect to individual working careers, personal development, and development of middle-level specialists, school enterprises give good basic training or full qualifications. School enterprises develop the necessary competencies, i.e. skills, values, knowledge and attitudes amongst students for meeting the challenges of the world of work and, especially, enhance self-support capabilities (self-employment, self-management).

For school enterprises to be effective, there should be clarity with regard to what role market production in the educational context should play within vocational

and technical institutions, and what they are supposed to achieve. Are they supposed to achieve self-employment and enterprise development, or industrial employment? Brigades in Botswana originally focused on self-employment generation vis-à-vis employment in the formal sector, rural development vis-à-vis industrialisation, and training in rural areas versus training in urban areas. Originally, it was thought that graduates would remain in the community as self-employed artisans; the reality is that most migrate to larger population centres and work for someone else. The curriculum should provide trainees with the ability to see other options. Not every trainee will be an entrepreneur, and most are too young or inexperienced. There is a proposal to entice graduates back into the system after a few year of gaining on-the-job experience by sponsoring programmes to assist them in working through the problems of starting and managing their own businesses. If the ultimate goal is industrial employment, then training in school enterprises should prepare workers in the core area of industrialisation: manufacturing, maintenance and repair.

Other related dominating motives for adopting the concept of school enterprises is relieving schools of the high training costs, income for students and trainees, the wish to make training more practice-oriented or practical. Vocational Training Centres in Papua-New Guinea have introduced market production so that youngsters are in a position to earn a living upon returning to their villages.

The broad impact of school enterprises has to do with the fact that their intended objectives go beyond the conventional orientation of classical vocational training. The objectives are more comprehensive, i.e., school enterprises offer training not only in the classical trades, but also in activities which satisfy the basic needs to secure the survival of people. They extend beyond training and production to the marketing of consultancy services, product development, technology transfer, and information services.

## 3.10 Financial options for school enterprises

The question of *who* should bear the cost of school enterprises as a basic mode within vocational training and education is becoming of increasing relevance because of the pressures of scarce resources. Closely related to this question, and of equal importance, is the *mode* of financing school enterprises as school enterprises are not merely commercial institutions oriented to the goals of market production, but primarily oriented to the goals of training and education as well as to social goals. Theoretically, there can be several choices in financing school enterprises.

1. One option for school enterprises is to *diversify* the mechanisms of providing technical and vocational education by combining public and private sources as well as profit-making and non-profit-making means. This could mean a *combination* of
   - direct financing from Government budgets,
   - the partial self-financing of school enterprises with assistance from donor agencies, and
   - complementing training in school enterprises with apprenticeship training in the modern sector as well as in the informal sector, carried out mainly by private enterprises at their own expense in accordance with their labour demands.
2. The second option for school enterprises to respond to pressures of scarce resources is through the *cost-recovery methods*, such as fees for laboratories, marketing of enterprise copyrighted inventions, contracts, consultancies, and sales of products and services. Another form of cost recovery is charging fees to the enterprises benefiting from the supply of skilled labour, and partial cost recovery through fee charged to the trainees.
3. The third option for school enterprises to respond to pressures of scarce resources is by *increasing institutional efficiency*. This includes the economic efficiency in the use of available educational resources so that the institution is able to be in a position to finance its operation at costs from its income. This includes close attention to student/teacher ratios, less expensive contractual arrangements, and divergence in salaries to reflect market demand for students. This option will be gone into in detail as school enterprises may be said to be oriented *inter alia* towards internal efficiency because they pursue both educational and economic goals.

**Issues in economic efficiency of school enterprises**

A major raison d'être for establishing school enterprises is the belief in internal economic efficiency in the use of educational resources, particularly in field of public sector education where the gap is widening between the increasing demand for education and training on the one hand, and the limited amount of resources to meet such demand on the other. The argument is that institutions of technical and vocational education should use available financial resources more efficiently. Further it postulates a better cost-effectiveness in comparison to resource inputs; i.e., the internal management of the school should consider their investment decisions without overlooking the economic constraint. In other words, total revenue must exceed total expenditure and also allow an adequate return on capital employed. This may be said to be the internal commercial goal of school enterprises.

Most methods for measuring educational efficiency[49] attempt to measure the performance of training and compare it with the necessary inputs in order to obtain information on the optimal utilisation of financial inputs by decision makers. According to these methods it becomes necessary not only to *quantify the cost of training*[50], but also to attach a monetary value to the *learning outputs*. The range of learning outputs subject to evaluation is enormous. Nevertheless, the main learning outputs of school enterprises may be characterised as follows:

1. the learning outcome, i.e., the trainees' competencies and qualification as skilled workers;
2. the trainees' productive achievements, e.g., an apprentice's competency utilisation in the production process, with a valuation according to the equivalent skilled-worker wage;
3. earnings[51] from the sale of goods and services emerging from the training process as well as other proceeds: e.g., rent, tuition, income from the cafeteria.

The learning *input* (academic achievement) comprises of two broad categories: those over which educational authorities have no control (previous educational and job experience levels of students and socio-economic background, gender, ethnicity, home environment, learning ability and trainees' interest) and those over which educational authorities have considerable control. Within the latter group, further differentiation can be made between financial inputs within the scope of school enterprise (teachers, buildings, teaching and learning aids) and elements involving no direct financial expenditures or costs (value-added concept of learning, incremental learning and instructors' classroom behaviour).

For any analysis of cost of training, very often the only suitable input elements are those that can be influenced by the school's decision-makers and which incur costs within the school enterprises. These may be termed the school-based production factors. Four cost groups are usually distinguished: personnel, operating costs, administrative expenses, and fixed-asset costs. Personnel costs are gross amounts including trainee, staff and supporting staff remuneration. Operating costs of schools are the costs of the educational process, and depend on the number of trainees and teaching materials. These consist of energy, consumables, learning-teaching aids, transportation, working clothes, and rent. Administrative expenses are incurred for managing and administrating school enterprises: insurance, taxes, fiscal charges, etc., consumables, communication and entertainment. Fixed-asset cost may be broken down into immovable and movable assets. Immovable assets are comprised of real estate; movable assets are comprised of tools, machines, and shop, laboratory, office and classroom equipment.

In the following, the economic efficiency aspect of technical and vocational training will be examined more closely across the various case studies. It is also necessary to address the question regarding the utilisation of income: is it used for covering operating costs, including the teacher salaries, or does it serve to pay students from low income families?

In some enterprises, educational goals take precedence over economic goals. These schools are very often characterised by a predominantly school organisation structure. They provide practical training on the basis of a simple level of equipment, have limited external relations and are normally under state control. These school enterprises tend to confine their objectives to the educational mandate.

This type of school enterprise generates no special input costs. However, in order to keep trying to minimise the costs of training, and at the same time maximise the economic benefit of existing resources, a situation may arise whereby learning achievements may have to be reduced in favour of directly marketable output factors, e.g., the production of goods by the trainees in the course of instruction. This illustrates one of the problems of combining commercial and educational goals in some school enterprises.

There are other school enterprises, however, which try to achieve an effective balance between educational

49 Educational efficiency is assessed in several different ways: cost-benefit analysis, cost-effectiveness analysis and input-output analysis.

50 The most common way of calculating the economic efficiency of school enterprises is through the cost control method, taking into account productive achievements, trainees' qualifications, and sales from goods and services. It is advisable to differentiate between gross costs, net costs, and earnings. Gross costs are understood as the total cost of training; earnings are the result of the school selling its goods and services plus miscellaneous revenues. The difference between the gross costs and the earnings yields the net cost of training, or the amount that must be financed by the training establishment or other organisations, since it exceeds the school's own goods and services output. Training costs comprise both a quantitative component, i.e., the amount of goods and services required to complete a school's training programme, and a value component, i.e., the quantification of prices of goods and services. The calculated cost is the result of multiplying the quantity of inputs by the prices of inputs.

51 The training of skilled workers in a school enterprise can yield direct and indirect forms of income. The proceeds resulting from the provision of goods and services from the customers or for internal needs are regarded as the school's direct income, while its indirect income includes earnings from the trainees' productive activities, e.g., in connection with practical training in a real enterprise. Mostly, the cost calculation of school enterprises takes into account direct income.

and economic goals. In such schools, although the costs of the input factors, such as manpower, equipment, infrastructure and material costs are substantially high, this is balanced by high earnings from the sale of goods and services. These schools achieve a positive net cost balance because they are able to earn substantial amounts of sundry income through vocational upgrading measures that utilise the existing inputs (in the case of PIKA, 30% of all income is attained in this way).[52] This may be attributed to the fact that such schools are more effective than other schools in adjusting to local market conditions. At the same time, they are able to increase their sale of goods and services without sacrificing their learning achievements. This has been made possible by combining economic and educational goals in the marketing of teaching services, such as offering further vocational training courses for welfare institutions and local industry enterprises.

In school enterprises that offer self-employment oriented occupational training and social education aimed at strengthening the self-help potential in urban squatter areas, there is a good basis through school enterprises for self-financing through self-employment within the executing institutions. This can be clearly seen from the experience of the Don Bosco Self-Employment Research Institute, Howrah. Here the income generated by self-employment is shared between the school, the bank, teachers and supporting staff, till the trainee is able to pay off loans and a fixed percentage of operating costs. The salaries of teachers, etc., have to, however, still be paid through governmental subsidies, donor agencies or contract work carried out for modern industry by the Don Bosco Technical School. This sharing of income approach serves as an incentive for all parties to participate in the training programme.

Self-support is as important for an individual as it is for the institution. Many of the students in educational institutions, particularly in vocational courses, come from families which have limited resources. The modality of school enterprises has been shown to create income for poor students and their families through the sale of goods and services produced by the students, and also to reduce opportunity costs for the participants who decide to go to school instead of work.

**Principles for assessing the suitability of the different modes of financing**

School enterprises are economically efficient institutions as they combine commercial production and educational objectives and most of them are also able to cover their operating costs. They, nevertheless, have to be dependent upon external contributions, especially during the initial phases. Due to the slow development of their financial basis, school enterprises have long take-off periods. At the start of these programmes, school enterprises are able to finance running costs to a very small extent and are thus reliant on outside financing. It is only in the well-established school enterprises existing outside state control that the training costs are fully covered from the income of the school enterprise, both from the training division and the production division (PIKA, Indonesia, and Don Bosco, India).

However, when assessing the suitability of the different modes of external financing, the following educational and equity considerations should be taken into account:

*Educational considerations*

- The combination of training and production requires adequately trained personnel and better school quality.
- A shift of financing responsibility directly to a private enterprise may leave little scope for concentrating on the learning objectives of the enterprise as this would clash with the business management and commercial objectives of the private firm.
- The more and more 'marketable' self-financing courses may distort the educational priorities of school enterprises. School enterprises should therefore limit their continuing education courses for regional industry, especially when it interferes with the educational goals of the trainees within the school enterprise.
- The emphasis on investment costs for physical infrastructure, equipment and teaching material, and the neglect of operating costs such as salaries, training instructors and social multipliers is detrimental to the successful implementation of the learning objectives of school enterprises. For, without well-trained instructors, school enterprises cannot be successfully implemented.
- School enterprises incorporate the notion of social education and effective linkages between school and community as well as between production and learning. These extra functions of school enterprises require expensive investments in adequately qualified teachers and instructors as well as in the employment of local craftsmen, social workers and technical experts for supportive measures.
- Financing should not only be on the basis of a calculation of economic efficiency as this calculation takes into account those learning results to which a monetary value may be applied. However, learning results very often depend upon the trainees' prior education, his learning and retention

[52] See Greinert, W.-D. and Wiemann, G. 1993, pp. 48-49

ability, and his interest. Furthermore, several learning outcomes are not amenable to objective measurement. Particularly, the results of the affective and social learning dimension (moral values, team work, and problem-solving) are difficult to measure in monetary terms. Finally, several outcomes of learning relate to institutional and managerial prerequisites such as a co-operative work environment.

- Training and education tasks should always take priority over the cost recovery aspect.
- The mode of financing should give due consideration to the aspect of sustainability of school enterprises. Heavy reliance on non-governmental sources may create the problem of not only external indebtedness, but also sustainability of school enterprises in addition to cultural and administrative problems.

*Equity and social considerations*

- The training of people from low-income families requires more time and personnel in order to make up for restrictive out-of-school influences.
- School enterprises, as the case studies exemplify, are intended not only for trainees from middle-class families but also for beneficiaries who can bear neither the direct nor the indirect costs of vocational training or further education, not least to say, the costs of extended training. Therefore, in many cases, grants or subsidies for the trainees are required to cover the direct training costs and often also the indirect costs for accommodation, food and/or transportation. These are essential to enable people from low-income families to participate in training. Governmental scholarships and loan programmes should however aim to overcome the inherent administrative and structural weaknesses of these programmes and serve as an antidote to the regressive effects of increases in fees, especially with regard to creating a system of separate schools for the rich and the poor.
- School enterprises which offer decentralised training and advisory services to recipients from the informal sector may have to bear high operating costs, mainly for staff payment and transportation. However, a nominal fee for training and advisory services provided to small and micro-entrepreneurs and self-employed business women might serve as an additional educational objective of promoting cost-conscious entrepreneurial thinking and/or sustaining the will for self-help.
- Although private commercial training institutes may provide good job-related training opportunities for some target groups, they are largely unsuited to meeting the competency requirements of all target groups. In fact, most enterprise-based private sector training tends to perpetuate the existing social disparities.
- School enterprises very often have to make up for insufficient basic educational competencies. This requires longer training periods than in normal training institutions.
- A consideration of these reasons clearly shows that the main burden and responsibility for the financing of school enterprises must be carried by the national budgets. This does not mean that it might not be reasonable and worthwhile to seek non-governmental sources by which at least part of the financing could be provided otherwise. Non-governmental sources, however, can only supplement the governmental efforts; they cannot be viewed as reliable sources or as alternative sources to public finances.

## 3.11 Mixes of private and public roles

The case studies have shown that the sponsors in school enterprises are mostly governments, private institutions, and donor agencies. Private sponsors include churches and non-governmental agencies. Their existence is separate from the management of the school.

The importance of an environment that will encourage and accept widely dispersed initiatives in such endeavours has long been stressed. Meanwhile, along with maturation in the development of national training systems have come both a rising awareness of local needs and increasing pressures on national budget: a combination that is encouraging decentralisation. However, state intervention is justified in limited situations such as financing training, direct provision, and various sorts of complementary policies.

**Role of private institutions**

Across countries, and even within countries, there are innumerable mixes of private and public roles. The so-called 'nonformal sector' in education and training is heterogeneous in many respects, and the very existence of this diversity lends flexibility and adaptability to national systems of education and training taken as a whole. It is among the 'non-formal' agencies that one will often find the readiest responses to new minor and, sometimes, major skill demands, along with perhaps the greatest diversity in degrees of formality and informality in the mixes and levels of skills taught, and in the tightness or looseness of associations with particular employers. The central question here is: how much public control or support should be introduced? and where public interventions are involved: how far responsibility and initiative may be decentralised?

Local business community are often willing and able to accept a much greater responsibility for productive activity in schools. There is enough evidence from a variety of countries to show that such activities can be cost-covering and thus be neutral in the public budget.

Increasingly, industrial and employers' organisations have developed linkages with schools, and they design and implement production and training-related activities jointly with school staff. This may be under the heading of technology education or market analysis. Such programmes are based on co-operation between multiple centres of control. These are organisations at different levels that have a minimum capacity and an interest in participating in training and production that cannot be handled by the school.

Apart from such more institutionalised forms of interaction, there are also numerous occasions where individual schools make arrangements with individual farmers, artisans, or service institutions in the locality. It is more and more common for such activities to be funded by implementing agencies or through parental contributions.

**Role of the State**

Despite the several advantages of co-operation with local industry in the area of skill development, it is unrealistic to limit all skill development to industry. The extent and quality of the private sector is constrained by the nature of the economy and level of enterprise development. These constraints require a continuing presence on the part of the government to ensure an adequate amount and quality of training.

Vocational and technical education, especially at the secondary level, has remained a central concern for the state. Relating vocational education and training directly to employment has remained much on the agenda as it remains a key instrument for the state to confront social and economic problems of national proportions. Governments and policy makers are trying to reorganise their education so as to cope with rapid changes in the economy, in society, and in the world of work. Twenty years ago, employees were assigned specific routine tasks and were expected to perform them reliably. Today, an effective business operates under different assumptions. Workers are expected to identify and solve problems, learn skills, personally manage non-routine problems, and make decisions which require a broad understanding of the work context. Despite all their weaknesses, there is call for public technical and vocational education establishments to play a definite role in finding new ways of teaching and learning, in promoting the socio-economic development of communities, and in making learning more relevant for individuals and societies. This includes a wide acceptance of the public technical and vocational education's responsibility for the development of competencies relating to the changing world of work (coping with new technologies and production processes as well as the displacement of workers and the growing informal sector) and the structuring of education towards production skills and self-employment.

As a result, school enterprises are increasingly coming to be incorporated in government educational policy. The manner in which this is being done is unique in India where the government has delegated apex institutions to provide adequate guidelines on the planning and implementation of school enterprises. In China, also, the Open Door Policy, and the creation of Special Economic Zones (SEZ) in certain areas of China, have provided the momentum for vocationalising to change the ratio of general secondary school students to vocational school students.[53] School enterprises have become an accepted part of the school with considerable support and guidance by state laws, local ordinances, and polices.[54] Regulations governing strategic inputs into the education system ensure that the state still strongly influences what goes on in school enterprises.

At the same time, governments must acknowledge their limitations as the only agency of socialisation. Public vocational institutions are organisationally, pedagogically, culturally and financially constrained to provide relevant education for the fast changing world of work. Although government should not be relieved of its responsibility of providing core skills and knowledge, instruments can be designed for, and resources be provided to the schools for implementation. Other areas of learning, however, can be defined at the local level through a direct interaction between schools, community and other interest groups such as industry or cultural organisations, and be implemented with the support of those parties concerned. Here, the role of the national government would be more indirect: providing guidance, co-ordination, professional services and supplementary funding. Thus, while there may be a clear central responsibility for core skills, i.e., foundation skills in language and mathematics as well as basic knowledge, science and social studies, the production and enterprise dimension can solicit direct inputs from other agencies such as the community and the local business world. The nature and level of these contributions vary across countries and different socio-economic and cultural situations.

53 Hook, B. and Lee, W.O., 1997
54 Cheng, K. M. (guest ed.); 1992, pp. 47-52

With international and domestic pressures for the development of primary education, secondary and vocational education may become major victims of budgetary squeezes; but with the expansion of elementary education on the one hand, and economic reform policies including globalisation and international competition on the other, the governments would be compelled to acknowledge the need for secondary vocational education.

Governments are confronted with the policy question of how far they wish to go in curriculum decentralisation and in allowing enterprises to participate in defining what youngsters should learn from school. In many countries, the problems of decentralisation deal with questions relating to equivalency of certification throughout the country: channels that would enable local enterprises to provide a meaningful input into curriculum decision-making. This requires great competence on the part of the planner and specialist to conceptualise curriculum structures that can absorb a good deal of local participation and handle fruitful interaction with enterprises and other local interest groups (e.g. industry, non-governmental organisations and parents). The practice, now common in industrialised countries, is for Ministries of Education to set a curriculum framework with attainment targets that specify types of skills and knowledge, and for appropriate curriculum organisations to develop model work plans for institutions to use as references.[55] This state-controlled market model may be useful too for the less industrialised countries. Characteristic for this model are forms of co-operation between public vocational schools and private training enterprises or inter-company training centres. Small and medium-sized enterprises participate in this form of training predominantly. The government provides a regulatory framework for technical and vocational education in private enterprises or institutions.

It may take time for school enterprises to gain the acceptance of governmental bureaucracy, in particular, official recognition of their graduate qualification. Governments should, nevertheless, support educational processes in school enterprises by adhering to a policy framework in favour of school enterprises. Governments should formulate polices that support and extend these types of schools and training institutes.

55 Ministries of Education in OECD countries generally concentrate on five essential functions:
(1) setting the objectives for the curriculum;
(2) approving the materials for use in public schools;
(3) financing those materials;
(4) ensuring that students from underprivileged backgrounds have an equality of access;
(5) disseminating the results of innovations, and reporting progress to the public at large.

The inclusion of production units has been very difficult for planners and managers to cope with, as it relates to a variety of expectations about combining education and production, and has to do with a domain of activities for which schools tend to be the least equipped to produce tangible results. A critical step in the planning stage is the effort to reach a consensus about what kind of production is required and what purposes it is meant to serve, the nature of technical skills, the connection between schools and the labour market, and the desirability of getting youngsters involved in productive work that may sometimes be considered exploitative and manual.

**Role of donor agencies**

External agencies participate in school enterprise programmes in a significant way, being directly involved in key elements of the programmes, including the very design of the learning content, its substance, structure and methodology.

The case studies of The Don Bosco Technical Institute (India) and PIKA (Indonesia) illustrate that a greater involvement of donor agencies generally assures a successful launching of a new approach. However, the danger clearly lies in a poor spread of these innovative approaches. The disproportionate administrative attention and resource inputs, and the protective attitude of such initiatives have, in many cases, been helpful in improving the image of school enterprises. But it remains a very difficult operation to bring such initiatives from a pilot to a national scale and to transfer effectively full responsibility into the ministry mainstream. The PIKA case study has shown that, eventually, imported training institutions can come to be indigenised, or adapted and absorbed fully into indigenous practices. It illustrates that the support of an external agency has, over the years, been restricted to technical assistance for in-service training for teachers and managers, as well as for writing materials.

During the 1970s and 1980s, Western donor agencies found some encouragement in supporting the linkage between learning and working as this was seen to help improve the relevance of education and training for the world of work and, at the same time, offset the growing difficulties of covering the high unit running cost of learning institutions. In recent years, the development of school enterprises within the institutions of general secondary education has not attracted widespread donor support. These are now being conducted by governments themselves in co-operation with local industry. This is not a bad development as better long-term results seem to be possible where control over planning and implementation

remains firmly with the appropriate national and private institutions.

Seen in the context of vocational training assistance to developing countries, this assistance has concentrated mostly on supporting the establishment of vocational training systems as a means of improving their infrastructure, whereas governments and local institutions have been left to realise the integration of vocational training for broader regional, trade and socio-economic development, including the informal sector, through the project approach.

This segmented approach has currently come under severe criticism. It is argued that if vocational training aid is to have a progressive orientation, its future strategy must be the establishment of diversified vocational training systems in which government, non-governmental organisations, donor agencies and local institutions play an important role in building bridges between formal and non-formal vocational education as well as between formal and informal economic sectors.

By incorporating school enterprises as one basic type of model within diversified vocational training systems, it is possible to make these systems more flexible and responsive to labour and market conditions. The notion of school enterprises is an important basic type of training which strikes a middle ground between formal and informal economies as well as between formal and non-formal modes of technical and vocational education. Vocational training assistance should acknowledge the fact that greater involvement of donor agencies may assure a successful launching of a new approach. However, if it is not integrated into a diversified system development, it cannot have long-term and sustainable effects.

## 3.12 Factors that may enhance school enterprises

**A policy environment**

The promotion of the concept of school enterprises needs support from policy makers.

Policy and legislation should influence the integration of production with technical and vocational education. Government could improve training's responsiveness to market forces by building a capacity for labour-market analysis, the monitoring of training costs and outcomes, and information gathering from employers to determine the situation regarding the demand and supply of training in production fields which have a demand in the market.

A useful starting point for any policy discussion on school enterprise is the issue of to what extent are schools in a position to introduce market production. This raises not just logistical questions about resource availability, but also value orientation of the community. As schools are identified with academic culture, their market orientation may represent a culture of manual work which may be regarded by the community as inferior. Policy should take into account to what extent the organisational and pedagogical set-up of a school is appropriate for the effective development of vocational skills (as opposed to the mere practical ones).

It is imperative that, while providing a policy direction towards technical and vocational education, past experiences of various schemes of linking educational processes with the world of work are taken into account. Some of the problems identified earlier would need to be removed through suitable measures. As regards overall policy, problems may include weaknesses in the conceptualisation of school enterprises, lack of clear policy guidelines that provide proper directives to the institutions.

**Development policy at the institutional level**

At the institutional level, school enterprises must be seen primarily as places for training and contributing to technological development. School enterprises must be quick to adapt to the demands of new technologies and processes; all of which translates into an adjustment in the training content.

School enterprises should follow a policy which provides the best trade-off in reaching social skills and productive skills on the one hand, and the financial capabilities of local, regional and national communities on the other.

Where school enterprises exist as mere profit-making institutions, these might provide dangerous competition to existing small enterprises. Since competitive situations cannot be ruled out, school enterprises require carefully adjusted development policies.

The relevance of school enterprises in the context of the development of technical and vocational training makes sense only when a balance is struck between economic, educational and social goals.

School enterprises must function in the market place. School enterprises can optimally and most effectively use market orientation as a vehicle for imparting technical and vocational skills if it is an integral part of a trade/industrial promotion programme.

**Parameters of ethical standards**

Training is more efficient and effective through production. It is important, however, to ensure that trainees do not become low-wage workers or bound servants to the cause of production. Skills transfers and positive work attitude are goals that must be kept in mind.

Any productive activity in the context of school enterprises must be conducted within the parameters of ethical standards demanded by the International Labour Organisation (ILO). The risks that child labour is involved in technical and vocational training institutions must be tackled at the policy and institutional level.

**Diversify financing**

As school enterprises are primarily institutions for training human resources, and places where education is a public and not a private good, self-financing and cost-recovery methods of financing should be seen only as supplementary options, rather than as alternative sources to public finances.

**Incentives**

The incentives that encourage the achieving of outcomes, may include reduced taxes for school enterprises, investment incentives, subsidised wages, preferred prices as well as industrial parks where the enterprises within them are exempt from taxes for a certain period of time. Industrial parks may be designed to enable students to be strongly established before they have to face the rigorous competition of the world of work.

In focusing on productivity and competitiveness, school enterprises should not loose sight of the need to bring the poor into these schools. Poor people's principal asset is their labour, and improving their productivity and earnings is crucial for getting them out of poverty.

Students may be encouraged to undertake skill training because of a stipend, or poorer adult workers may be exempted from paying fees, or schools enterprises may be encouraged to integrate the poor in their training programmes because the government, a donor agency or a clerical organisation is ready to meet the costs. The location of school enterprises in poor areas can be a major source of skill acquisition for the economically disadvantaged.

The business risks arising during the starting phase should be taken over by partners: state, church and non-governmental organisations. For example, in the case of school enterprises specialising in construction trades, the government or church should make land and material available for the construction of houses, and be active in the acquisition of contracts especially in the construction of settlements in poorer areas.

**Advice**

School enterprises will require advice from experts in the government, private enterprise institutions or universities. This should enable them to build a strong base for their enterprises, increase productivity, and improve their training.

**Networking**

An essential element can be the enhancement of networking among teachers, managers and educationalists involved in school enterprises. Learning from each other can take place between institutions, or between regions and districts, and it tends to be very inspiring for all participants. The school management should co-operate with representatives of the local economy, community, and region.

**Certification**

The government must recognise the certification of school enterprises. Students must receive certification that encourages participation in the scheme as this may lead to greater status and promotion.

Efforts may have to be made to enhance the social prestige of non-formal institutions by establishing communication with formal institutions, and by endeavouring to obtain official recognition for the diplomas and certificates.

To the extent that school enterprises may socialise students to simpler occupations, it may implicitly deny access to higher occupations which require a good foundation of general academic science. It should, therefore, be possible to return to the academic stream without undue loss of time.

**Support infrastructure**

School enterprises require a well-designed and effective support infrastructure. Some of the most critical types of supports are teacher education, curriculum development, and ongoing professional and technical support.

The introduction of school enterprises requires an adjustment of existing pedagogical services. Here, the greater task tends to be the development of effective linkages with industrial organisations. Guidance and active contribution of these is important for ensuring the relevance and effectiveness of technology education and production projects.

**A monitoring system**

Continuous and systematic monitoring should be conducted. In the guidelines provided by the Central Institute of Vocational Education, India[56], it has been recommended that a continuous appraisal should be conducted at intervals of not more than one month. The appraisal should focus on production (raw materials, means of production, finished product, quality, labour use, infrastructure facilities) and financing (running cost, depreciation, income generated, incentives to trainees and teachers, extension activities, innovations).

Review reports should be compiled once every month. They should be kept on record for reference and guidance for the immediate future. The accounts must be well-maintained and audited on a yearly basis. Learning outcomes should also be monitored regularly.

**High standard of training**

A reduction of operating costs by means of production for the market is only possible if the goods and services are of a high standard. The aim, therefore, should be to provide training of a very high order which leads to the deepening and diversification of skills which vocational courses are to provide.

**Critical variables for the success of school enterprises**

Evaluations of individual institutions have shown that the critical variables for successful implementation of school enterprises are:

- good leadership
- a common understanding between management, staff and the community about the nature and purpose of the programme
- enforceable agreements on inputs to be provided
- transparency in decision making and accounting
- participation by the communities within the area of influence of the school enterprise
- economic feasibility of the production and marketing schemes
- balance between economic and educational objectives
- awareness of the participants as regards labour relations, the rights of workers, systems of remuneration, and the ways in which appropriation of the economic surplus is effected, etc.
- assistance for trainees in the setting up of mini-business enterprises
- innovative performance and the pursuit of excellence in economic life in order to stimulate both the formation of human resources and their more effective utilisation
- the existence of a productive enterprise which is oriented to market conditions as decisive for the financial basis of meeting training costs
- public financial support for investments in innovations and improving the quality of teaching
- perception of school enterprises as a public good to which all sections of society have access, rather than as a private good which restricts access to only some segments of the population
- intimate relationships with the firms to which school enterprises provide skilled labour and technicians.

**Lessons to be learned**

From the study of school enterprises, it may be necessary to take into account the following principles in financing and managing technical and vocational education that is employment-related and vocationally specialised.

- The importance of both general and technical components of vocational skills within the definition 'human capital'.
- The importance of technical and vocational education as a decentralised activity. Local initiative is a leading force in school enterprises. They are being driven not only by educational authorities, but also by local business and community groups, industries, and non-governmental organisations. These groups have the technology and expertise in both traditional and newly emerging skills. These new categories of participants are deeply affecting the 'vision' and expressed interests of traditional central educational authorities.
- It takes a combination of methods of vocational education theory, on-the-job training, and diverse sorts of non-formal methods to provide a flexible system for the formation of human resources in any society.
- Closeness to utilisation and applications of competencies is of crucial importance for investments in employment-related vocationally specialised skills. School enterprises entail the notion of training people in close relation to future employers, so as to place them straight away in jobs that use their skills.
- People are motivated and show an interest in studies when future returns become visible to them. Motivation also means giving scope for independent endeavours, thereby enlisting the creative potential and participation of many people in the formation and utilisation of skills.
- Basic educational competencies are the prime step in developing vocationally specialised competencies in men and women. If insufficient attention is paid to these competencies, investments in technical and vocational education can have a distorting effect.

56 Verma, A. P., 1996

- The scope for development through vocational specialisation and employment-related training depends on the scale of the market. This means participation in markets for new and innovative products must be greatly enlarged. It also means producing goods of high quality, rather than poor imitations of products that others produce better. There is every indication that school enterprises will continue to develop, as schools seek investors and opportunities to produce products that meet international standards. The scale and extensiveness of such a phenomenon is perhaps most distinctive in China and less so in other countries.

School enterprises present clear evidence on the flexibility and adaptability of such schools to changes in labour and market conditions. They meet not only temporary gaps in the formation of critical skills among the adult populations, but also long-term learning goals. And they constitute a basic type within technical and vocational education systems, supplementing on-the-job and enterprise training. School enterprises represent an important way of diversifying the finance of technical and vocational training institutions.

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